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A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS
IN THE
MEDICAL AND SURGICAL SCIENCES.

EDITED BY
HOBART AMORY HARE, M.D.,
PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA; PHYSICIAN TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL; ONE TIME CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA; MEMBER OF THE ASSOCIATION OF AMERICAN PHYSICIANS, ETC.

ASSISTED BY
H. R. M. LANDIS, M.D.,
VISITING PHYSICIAN TO TUBERCULOSIS DEPARTMENT OF PHILADELPHIA HOSPITAL, TO THE WHITE HAVEN SANATORIUM, AND MEMBER OF STAFF OF HENRY PHIPPS INSTITUTE; DEMONSTRATOR OF CLINICAL MEDICINE IN THE JEFFERSON MEDICAL COLLEGE.

VOLUME I. MARCH, 1905.

SURGERY OF THE HEAD, NECK AND THORAX—INFECTIOUS DISEASES, INCLUDING
ACUTE RHEUMATISM, CROUPOUS PNEUMONIA, AND INFLUENZA—
THE DISEASES OF CHILDREN—LARYNGOLOGY
AND RHINOLOGY—OTOLOGY.

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LIST OF CONTRIBUTORS.

WILLIAM T. BELFIELD, M.D.,

Associate Professor of Surgery in the Rush Medical College; Professor of Genito-urinary and Venereal Diseases in the Chicago Polyclinic, Chicago.

JOSEPH C. BLOODGOOD, M.D.,

Associate in Surgery, Johns Hopkins University, Baltimore, Md.

JOHN ROSE BRADFORD, M.D., F.R.C.P., F.R.S.,

Professor of Medicine and Physician to the University College Hospital, London

JOHN G. CLARK, M.D.,

Professor of Gynecology in the University of Pennsylvania, Philadelphia.

WILLIAM B. COLEY, M.D.,

Assistant Clinical Lecturer on Surgery, College of Physicians and Surgeons; Surgeon to the Hospital for the Ruptured and Crippled, New York.

FLOYD M. CRANDALL, M.D.,

Adjunct Professor of Pediatrics, New York Polyclinic Hospital; Visiting Physician to the Minturn Hospital for Scarlet Fever and Diphtheria; Consulting Physician to the Infants' and Children's Hospitals, New York.

WILLIAM EWART, M.D., F.R.C.P.,

Physician to and Joint Lecturer on Medicine at St. George's Hospital, and Physician to the Belgrave Hospital for Children, London.

CHARLES H. FRAZIER, M.D.,

Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, Howard, and Philadelphia Hospitals.

WILLIAM S. GOTTHEIL, M.D.,

Professor of Dermatology and Syphilology, New York School of Clinical Medicine; Consulting Dermatologist to the Sheltering Guardian Orphan Asylum; Dermatologist to the Lebanon and Beth Israel Hospital, and to the German West Side Dispensary, New York.

CHARLES PREVOST GRAYSON, A.M., M.D.,

Lecturer on Laryngology and Rhinology in the Medical Department of the University of Pennsylvania; Physician-in-Charge of the Department for Diseases of the Throat and Nose in the Hospital of the University of Pennsylvania; Laryngologist and Otologist to the Philadelphia Hospital.

643

EDWARD JACKSON, M.D.,

Emeritus Professor of Ophthalmology in the Philadelphia Polyclinic.

H. R. M. LANDIS, M.D.,

Visiting Physician to Tuberculosis Department of Philadelphia Hospital, to the White Haven Sanatorium, and Member of Staff of Henry Phipps Institute; Demonstrator of Clinical Medicine in the Jefferson Medical College.

RICHARD C. NORRIS, M.D.,

Assistant Professor of Obstetrics in the Medical Department of the University of Pennsylvania, Philadelphia; Physician-in-Charge of Preston Retreat.

ROBERT B. PREBLE, A.B., M.D.,

Professor of Medicine in Northwestern University Medical School; Attending Physician to Cook County, St. Luke's, Wesley, German, and Polyclinic Hospitals, etc., Chicago.

ROBERT L. RANDOLPH, M.D.,

Associate Professor of Ophthalmology and Otology in Johns Hopkins University, and Associate Ophthalmic and Aural Surgeon to Johns Hopkins Hospital, Baltimore, Md.

WILLIAM G. SPILLER, M.D.,

Professor of Neuropathology and Associate Professor of Neurology in the University of Pennsylvania; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania and in the Philadelphia Polyclinic.

J. DUTTON STEELE, M.D.,

Associate in Medicine, University of Pennsylvania.

ALFRED STENGEL, M.D.,

Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia.

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PROGRESSIVE MEDICINE.

MARCH, 1905.

SURGERY OF THE HEAD, NECK AND THORAX.

By CHARLES H. FRAZIER, M.D.

TRAUMATISM

Remote Consequences of Head Injuries. A series of Hunterian lectures were delivered by English[1] upon the subject of head injuries with especial reference to the remote consequences. The author studied the reports of some 300 cases, and classifies them under three heads: 1. Those with no effects. 2. Those with slight effects. 3. Those with marked effects. The observations were made at intervals of from one to twenty years after the accidents. The 200 cases which he was able to classify were divided into two groups of 100 each. In one slight or marked effects were noted in 69 per cent., and in the other in 52 per cent. Of the entire number only 12 patients died, and in but 1 of these could death have been said to be the direct result of the injury. The effect upon the individual's working capacity depended upon the form of occupation: 15 were able to do light work; 7 were partially and 6 totally incapacitated. Of 78 cases in which there was no evidence of fracture, 51 showed no signs of impairment, and of the remainder but 3 were totally disabled. A great deal of stress is laid upon the enforcement of mental rest after the injury has been received. It was noted that the best results were obtained in those cases in which mental rest was insisted upon for a reasonable period. In a general way it may be stated that in early life and in old age the powers of recuperation are not so good as in the intervening period. Among the after-effects are included the impairment of special intellectual faculties; thus, traumatic amnesia may be temporary or permanent, the musical and arithmetical faculties may be lost, as well as the sense of smell; somnambulism developed sometimes in children; in others there were persistent nystagmus and deafness;

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[1] Lancet, February 27, 1904.

in others, again, chronic headache, vertigo, depression, accommodation asthenopia, exaggeration of knee-jerks, slow or intermittent pulse. In speaking of the degree of mental impairment, he says: "While some degree of mental impairment is comparatively common after injuries to the head, the changes are seldom sufficiently marked to be included under the heading of insanity. Insanity may result from injury to any part of the head. Traumatism leads to insanity in two ways: 1. Direct insanity due to the actual injury to the brain or its membranes apart from hereditary or other predisposing causes. 2. Indirect insanity—that is to say, any form of insanity occurring as the result of lowered resistance of the brain due to injury in patients with a predisposition to insanity, hereditary or otherwise. Every variety of mental change may be produced by traumatism, although some forms are commoner than others. It is at present undetermined whether injury to the prefrontal region is more than likely to be followed by mental disturbances than injury to other parts of the brain. Only a small proportion of the cases of traumatic insanity are open to relief by operation, for a localizing indication in an accessible region must be present. The results so far have been encouraging, and, although the operation must necessarily be exploratory, it is fully justified in suitable cases, especially in face of the otherwise hopeless condition of these patients.

Hyperæsthesia in Head Injuries. After certain injuries of the head, as gunshot wounds, hyperæsthesia may develop in the distribution of the cervical nerves. The connection between the brain and the cervical nerves must be through the sympathetic at the base of the brain to the superior ganglions of the cervical sympathetic and thence to the upper cervical segments. Milner[1] reports three cases of gunshot wounds in which hyperæsthesia was well marked. In the first case a gunshot wound in the right temporal region, there was severe pain referred to the upper portion of the thorax. There were no symptoms of meningitis, nor of increased pressure; the region of the distribution of the trifacial was exceptionally free from sensitiveness. The seat of hyperalgesia was exclusively in the upper cervical zone. In the second case, on the day of the injury, there was marked hyperæsthesia in the upper portion of the thorax, to the middle of the sternum, on the neck up to the border of the jaw, and as far as the hair line of the head, but none in the face. The third case was a gunshot wound in the frontal region; there developed a hyperalgesia of the thorax, neck, and head (but not of the face), which had not disappeared at the end of a month and a half.

Fractures of the Skull. The Hunterian lectures on fractures of the skull, which were delivered by Rawling,[2] have attracted a great deal of attention and are worthy of careful study. The first lectures of the series are devoted chiefly to a discussion of the various theories which have been put forward to explain the production of fractures. Rawling is of the opinion that too little attention has been paid to the anatomical peculiarities of the skull, especially with reference to basic fractures. Stress is laid upon the fact that the base is in fact weaker than the vault, presenting numerous weak areas and weak lines which explain in many instances the direction that fractures of the base follow. In summing up his conclusions as to the various theories expounded, Rawling is of the opinion, first, that "the bursting and compressing theory and the contre-coup theory are both untenable; second, that Aran's irradiation theory, with certain modifications, accounts satisfactorily for those basic fractures which result from blows on the vertex; and, third, that most basic fractures result from forces applied directly around the basic level, and that these fractures are the result of a splitting force, the line of fracture tending to travel across the base, parallel to the original direction, but not necessarily in the same straight line."

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[1] Berliner klin. Woch., Nos. 17 and 19, 1904.

[2] Lancet, April 9, 1904.

Certain considerations should be given to other features which exercise great influence on the actual direction of the fracture, as, for example, the influence of sutures, of the air sinuses, of the auditory region, and of the basic foramina.

As to fracture of the vault, those of the external table are of such rare occurrence and of such difficult diagnosis that they form no exception to the rule that exploration should be carried out when there is any suspicion that a more extensive injury to the internal table may also be present. Fractures of the internal table are most common and most extensive in those regions where the diploic tissue is most abundant—*e.g.*, the mid-parietal and anterior frontal regions. Too much stress, therefore, cannot be laid on the fact that (1) fractures of the internal table only may exist without any visible or palpable injury to the external table, and (2) that when the external table is fractured there is in nearly every case a more extensive fracture of the internal table.

Certain peculiarities in the structure of the child's skull influence the direction and extent of fracture. In the first place the bones of the vault are elastic and pliable, and, secondly, a blow may lead to a bending in, temporary or permanent, without any actual fracture. Secondly, the diploic tissue is practically absent and consequently fractures of the internal or external tables only are almost unknown. Thirdly, the air sinuses are not existent or small. Bruising and superficial laceration of the brain are, however, more common in children than in adults, owing to the greater delicacy in structure of the arachnoid, pia mater, and cortex.

The mortality, varying according to the fossa implicated, increases from before backward. Naturally in fractures of the posterior fossa, containing as it does the vital centres around the fourth ventricle, the prognosis is correspondingly grave.

HEMORRHAGES. *External hemorrhages* may occur from the ear, nose, and orbital region. Of that from the ear too much stress is laid upon the fact that hemorrhage from the ear results from other causes than basic fractures, and the symptoms, when secondary to a blow on the head, should be regarded as practically diagnostic of fracture of the middle fossa. A very free hemorrhage from the ear strongly suggests an extradural hemorrhage from the middle meningeal artery, although in rare instances it may be indicative of an injury to one of the venous sinuses. Hemorrhage into the orbital region produces paralysis of the muscles, both from actual mechanical impediment to movement and from pressure on the nerves supplying the muscles, subconjunctival hemorrhages, palpebral and peripalpebral hemorrhages, and proptosis. Proptosis, severe, appearing almost at once, and progressive, suggests a severe fracture in the region of the sphenoidal fissure and cavernous sinus; when moderate, a fracture of the orbital walls; and appearing days or weeks after the injury, a fracture involving the region of the cavernous sinus, with injury to the internal carotid artery and the formulation of an arteriovenous aneurysm.

Internal Hemorrhages. The most important and suggestive features of fractures of the middle meningeal artery, according to the author's experience, are as follows: 1. The appearance of a temporal hæmatoma. 2. Copious and continued hemorrhage from the ear. 3. Twitchings of the facial muscles on the opposite side and twitchings or spasm of the muscles of the opposite arm and leg. 4. A brief lucid interval between the states of concussion and collapse. 5. Some alteration in the pupil of the affected side, more commonly a contracted pupil. Operation should be resorted to at the earliest moment; in doubtful cases it is better to operate and find no hemorrhage than to defer radical treatment until too late. If necessary the external carotid artery (not the common carotid) should be ligated.

CEREBROSPINAL FLUID. The escape of cerebrospinal fluid from the ear and nose is so much spoken of in the text-books that it is supposed to be of common occurrence, but such is not the case in Rawling's experience. The escape of a watery fluid in large quantities has been noted in the absence of fracture, and is derived from the membranous labyrinth or from the membranes of the ear or nose as a result of great vasomotor dilatation of the vessels. A diagnosis cannot always be based upon a chemical analysis; in the first place, although cerebrospinal fluid contains little or no albumin, the fluid is usually mixed with blood, which itself contains albumin; secondly, though there is a reducing substance in cerebrospinal fluid, it may only be found in the first portion which escapes, as later the fluid soon becomes a mere serous exudation. If the discharge begins within twenty-four hours of the accident, or if it is colorless and profuse, and if it continues for some days, the fluid is *almost certainly cerebrospinal in nature.* The time of onset, the duration, and the quantity are all subject to great variation. The discharge of cerebrospinal fluid does not materially influence the prognosis. It is inadvisable to syringe out the ear, as in so doing micro-organisms may be forced into the subarachnoid space. It is a better plan to swab out the meatus with some strong antiseptic and insufflate a little iodoform powder. When the fluid escapes into the nose, little can be done to prevent infection. Meningitis is a common result of fracture of the anterior fossa with this symptom.

CRANIAL NERVES. If it were not for the protection offered by their strong dural sheaths, the cranial nerves would not escape injury so frequently after fracture of the base. Injury to the olfactory nerves is the result almost invariably of a direct fracture involving the cribriform plate. As to the optic nerves, it is more than probable that an injury to them is secondary to a fracture, tearing off the anterior clinoid process, the fragment compressing or tearing the optic sheath and perhaps causing a hemorrhage within the sheath. The third, fourth, fifth, and sixth nerves are rarely subject to direct injury, but may be compressed by extravasated blood. Isolated paralysis of the sixth nerve—a not uncommon complication—results from the implication of the nerve as it laterally grooves the dorsum ephippii, which process is occasionally torn across in a fracture passing from one middle fossa to another. The seventh and eighth are, however, more commonly involved than any other basic nerves, owing to their intrapetrous course. The bases in which these nerves are implicated may be classified as follows: 1. Early and partial paralysis of the facial nerve, accompanied by a variable degree of deafness. 2. Early and complete facial paralysis, with complete deafness. In the first group are included a great majority of middle fossa fractures, tending to involve the auditory region and evidenced among other symptoms by hemorrhage from the external auditory meatus. The arrest of function in the facial nerve is due often to hemorrhage and the deafness to various causes, according to the damage done to the membrane and vesicles. In many cases of this class recovery may be complete. In the second group of cases the fracture is usually the result of a blow in the occipital region, the fracture traversing the thin cerebellar fossa to the outer margin of the jugular foramen, extending thence across the petrous bone and terminating by comminuting the tegmen tympani. In this fracture the damage is irreparable; the facial nerve is cut clean across, and the auditory apparatus is severed in two. The ninth, tenth, and eleventh nerves passing through the jugular foramen are well protected and escape injury, and the twelfth nerve is practically never involved.

Variations from the normal in body *temperature* are quite constant; practically all severe cases of head injury show some definite thermometric changes, not so far as we know from any special lesion of bone or cortex, but resulting probably from the disturbance of the heat-regulating centre exerted by the injury. The temperature progressively rises as the cardiac and respiratory centres fail. The thermometric changes are so constant that they may be regarded as an almost infallible guide to the prognosis. If the temperature, at first subnormal, undergoes a steady and progressive rise, the prognosis is most unfavorable. If the temperature, at first subnormal, rises to 101° and remains steady for a short while, the crisis has been reached. If the temperature rises further the prognosis is gloomy; if it falls, there is hope of recovery. The temperature, at first subnormal, may remain so, or does not rise above normal. If the former, the prognosis is very bad; if the latter, very good.

From a routine examination of the fundus oculi in all his cases, Rawling found two distinct varieties of changes: (1) a disk with normal outline, the fundus showing marked engorgement of the retinal veins, however; and (2) a fundus presenting all the signs of true optic neuritis. The latter is seen only in those cases which succumb to a septic meningeal infection.

After discussing the various theories whereby the brain is lacerated, with inclinations toward the contre-coup theory, Rawling discusses the *pathogenesis of concussion.* He does not believe that concussion implies necessarily the existence of a brain laceration; concussion shows a close analogy to the condition of shock with certain superadded cerebral symptoms. The conspicuous lesions are venous engorgement and arterial anæmia in the first stage, and active hyperæmia in the second or reactive stage. Though the cerebral vessels are not presided over by the vasomotors, the venous engorgement of the cerebral vessels is probably secondary to the general venous engorgement of the right side of the heart and of the venous system, especially the splanchnic area, such as one sees in shock; in most cases the typical compression symptoms are absent; the symptoms peculiar to compression are probably due to increased pressure on the vital centres in the medulla.

As for *treatment* in the early stages, when shock is the conspicuous feature, the usual remedies should be adopted, but as reaction sets in the head should be elevated, ice applied to the head, and venesection practised from the external jugular. The latter is of especial value in reducing the intracranial exudation and pressure. Inasmuch as in all fissured fractures the injury to the internal table is apt to be greater than injury to the external table, early trephining and exploration are advocated in all doubtful cases. In cases of comminuted fracture the reposition of the comminuted fragments is open to objection, first, in that they are a source of irritation and increase the tendency to the formations of adhesions; secondly, because the fragments rarely undergo union; and, thirdly, because, owing to the fact that suppuration frequently occurs in this class of fractures, the fragments will undergo necrosis. The introduction of metal plates and gold-foil will prevent the formation of adhesions between the scalp and dura and between the dura and brain.

In those cases of basic fracture with or without compression, but pointing to a fatal termination, Rawling suggests a novel method of treatment which is based upon sound reasoning. Death in these cases is due to increased intracranial tension acting most forcibly on the nuclei in the region of the fourth ventricle; the amount of fluid in the cerebellar fossa is almost always much increased even when there is no obvious compressing agent, such as hemorrhage, foreign body, etc. An attempt should be made to relieve pressure by practising craniectomy in the cerebral fossa on the opposite side if the injury is inflicted in the anterior part of the head, and on the affected side if the blow was delivered in the occipital region.

Some of Rawling's views were diametrically opposed to those usually accepted; and with a view of contributing a number of consecutive observations toward the settlement of this question, as well as of studying other points of interest, Walton[1] went over the autopsy reports of fifty cases of *basal fracture*. In his opinion the following would be a reasonable working hypothesis as to the cause also of basal fractures: "When the trauma results from (1) pure compression, the bursting principle alone, or at least predominantly, underlies the fracture; (2) from a sharp blow, the violence is greatest at the point of impact and the transmission principle predominates; (3) from a fall, both factors take part. Between these three forms of trauma—*i. e.*, compression, blow, and fall—many gradations may occur, complicated still further by the character of the object causing impact and the age of the individual." In his series of fifty cases Walton found that "in a majority of the cases the basal fracture resulted from impact received in the horizontal plane upon the skull, whether upon the frontal or occipital region or upon the side of the head. While certain basal fractures extended from the vertex, there was no suggestion of the contre-coup of earlier writers. The line of fracture tended to enter the fossa nearest the point of impact, and to extend in the general direction in which force was applied. The lines of fracture in traversing the base tended to follow lines of least resistance, and in twenty-two of the fifty cases these lines corresponded more or less accurately to those indicated by Rawling, but the exceptions were too marked and too constant to allow the establishment of fixed rules. The sella turcica was implicated in 36 per cent. of the fractures. The petro-occipital and masto-occipital sutures furnished common lines of least resistance. Fractures extending across the base tended to run parallel to the petrous portion of the temporal bone and through the sella turcica. Certain blows on the occiput tended to cause a line of fracture extending to the jugular foramen or across the petrous bone. The portion of the petrous bone containing the auditory apparatus showed itself peculiarly liable to fracture, more often transversely than longitudinally. In seven cases (14 per cent.) the fracture was limited to the base after vault impact in the horizontal plane. Neither Rawling's theory of transmitted force nor the theory of bursting fracture of von Wahl and others suffices alone to explain these cases. The results of experiments with bodies of simpler structure would suggest that the bursting principle predominates in pure compression of the skull, and the principle of transmitted force in case of blows, while both play important parts in case of falls. The orbital foramen was implicated in 21.4 per cent. of the cases of orbital fossa fracture. Inequality and immobility of pupils, or both, furnish the most frequent and unfavorable sign of fracture of the base. In the forty-four cases in which the pupils were recorded, they were normal only in thirteen. Injury to the ciliospinal tract in its intracranial course is a more probable cause of the Hutchinson pupil and the other pupillary changes than injury to the third nerve or to the cortex, though no single lesion explains all cases. The reflexes may be lessened or lost in fracture of the base, as in any case of violent jarring of the brain. On the other hand, they may be increased even to spasticity, probably through direct pressure on the pyramidal tract, as by hemorrhage. It is probable that the initial result of the impact in all cases is a tendency toward lessening or loss of the reflexes. Profuse and persistent bleeding from the ear does not suggest middle meningeal hemorrhage. No middle meningeal hemorrhage was found in the cases of profuse and persistent bleeding, and, conversely, hemorrhage from this artery occurred eight times without and once with only slight bleeding from the ear."

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[1] Annals of Surgery, November, 1904.

Choked Disk in Cranial Contusions. Bachauer[1] describes two cases in which simple concussion of the brain was accompanied by choked disk and headache; in one the choked disk began to appear five days after the injury, and was still present six years later; in the second case haziness of the optic nerve was still visible five years after the injury. In many cases of head injuries, though extravagant claims for damages have been made on the ground of vertigo, persistent headache, it is almost impossible to determine whether or not the patient is malingering. In the above instances, however, there were well-developed and easily recognized lesions.

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[1] Deutsche med. Wochenschrift, February 25, 1904.

MORPHINE AS A PROPHYLACTIC IN CEREBRAL INJURIES. The beneficial effects of opium in the treatment of patients suffering from serious cerebral injuries has long been recognized. Many of the older textbooks recommended the administration of opium in the form of Dover's powder as a routine treatment.

MacDougall[1] reminds us of the excellent results to be anticipated from the free use of morphine. If opium by its action upon the nervous system quiets the brain cells and lessens the functional activity of the nervous fibrils which connect them with one another; if it lessens pain and removes the effect of peripheral stimuli; if it contracts cerebral arterioles and through the cardiac ganglia renders the heart's action slower and vascular pressure less pronounced, then its effect upon a brain that is traumatically damaged and that demands quiet for its repair can only be beneficent.

Cerebral Hemorrhage. A rather interesting case from a medicolegal standpoint was reported by Atwood.[2] The patient, in alighting from a trolley car, fell to the ground, striking his head. In a short time the patient became unconscious, and died about nine hours after the accident. There were no signs of external injury, but at the autopsy one clot was found beneath the skull near the occipital protuberance and another, about the size of a golf ball, in the frontal lobe near the longitudinal sinus. The hemorrhage was explained on the contre-coup theory, the patient falling forcibly on the back of the head with sufficient violence to cause by contre-coup a rupture of a bloodvessel in the parietal region. The court asked this question: "If there were no external marks of violence and no fracture of the skull, how was it possible to state that the cause of death was due to violence or the fall?" The answer was: "The man never having had any cerebral symptoms of disease before, and in this case the symptoms having come on immediately or soon after an injury, with the finding of an ante-mortem blood clot beneath the scalp, in the region where he was struck when he fell with force, was evidence enough to consider the hemorrhage of the brain which caused death to be due to an injury and not to previous disease, together with the fact that there was no other pathological lesion present." *The court so ruled.*

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[1] Lancet, June 25, 1904.

[2] Boston Medical and Surgical Journal, March 24, 1904.

In the case reported by Krauss[1] there occurred a hemorrhage by contre-coup between the dura and the pia over the cap of Broca in the third convolution of the left parietal convolution. The patient sustained the injury by striking his head as he fell to the ground. The symptoms developed slowly and culminated in a focal epilepsy of the Jacksonian type on the fourth day. The vessel injured was undoubtedly a small vein of the pia and not one of the meningeal branches. After the clot was removed the patient made an uneventful recovery.

Several interesting features were noted in a case of intracranial hæmatoma reported by Gordon and Harris.[2] The extreme slowness with which the symptoms developed was the most striking feature. Not until two weeks after the accident (the patient having been struck in the head with a large stone) did the first sign of any serious intracranial lesion manifest itself, and that was a pain in the right leg. From that time on to the time of his admission to the hospital, about two months after the injury, a group of motor phenomena developed which pointed to a lesion near the precentral fissure. At that time the patient was more or less imbecile, nervous, and suspicious. At the operation a cavity the size of a hen's egg was found and evacuated in the substance of the brain more or less centrally over the Rolandic fissure. That the patient did not improve rapidly after the removal of the clot was due, it was suggested, to the fact that the brain did not expand immediately the clot was withdrawn. Once improvement began the restoration of tone to the muscles of the arm and leg took place rapidly, though not until the lapse of two months had the mental symptoms disappeared entirely. The slowness with which the evidences of pressure developed was very suggestive of a subarachnoid in contradistinction to an epidural hemorrhage. Bleeding from the middle meningeal or a branch would be much freer than from one of the intracranial vessels.

Psychical Disturbances in Lesions of the Frontal Lobe. It is a well-established clinical fact that lesions of the frontal lobe of the brain are in some instances attended with psychical disturbances. The observations which have been made at various times do not allow us even to attempt to localize with any degree of accuracy the centres in the frontal lobe for any of the various psychical functions. The results following disturbances from one cause or another of the frontal lobe have, indeed, been variable; in some instances a loss of considerable amount of cerebral tissue will be unattended with any disturbance whatsoever, and, again, there are other cases in which lesions of no considerable extent are attended with very definite disturbances. Then, again it is difficult to understand why after injury, as, for example, one in which there may be a general concussion or contusion, with increase of the intracranial tension and cerebral pressure, the symptoms will be those which can be attributed only to a lesion of the frontal region. Borchard,[1] in considering the etiology of psychical phenomena, is inclined to believe that they are due not to the lesion itself primarily, but to the recovery phenomena surrounding or resulting from the lesion. Thus, in cases of advancing tumor or in cases of abscess there will be in advance of the tumor and around the abscess a zone in which the tissue will show evidence of irritation, and so after injuries there will result a more or less permanent disturbance of the circulation of the meninges or of the brain itself. In this connection he reports a case of abscess of the frontal lobe which exhibited three points of especial interest. First, the time intervening between the injury and the development of the abscess. Second, the presence of abnormal psychical conditions during the existence of the abscess. Third, the return to a normal psychical state after the abscess had been opened. The abscess did not make itself manifest until eight months after the injury was inflicted, at which time signs of acute psychical disturbances made their appearance. That these symptoms were due to the development of the abscess and the resulting recovery phenomena in the tissues and not to the result of the injury is very evident from the fact that the symptoms did not appear immediately after the injury, but only when the abscess developed, and disappeared again after the abscess was opened.

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[1] American Journal of the Medical Sciences, September,1904.

[2] Lancet, April 30, 1904.

Injuries of the Hypophysis. This question was discussed at the Thirty-third Congress of the Deutsche Gesellschaft für Chirurgie. Madelun recorded a case of a girl, aged nine years, who had received a gunshot wound of the head, and the course of the bullet was such as to suggest an injury to the hypophysis or its surroundings. The child had a unilateral amaurosis the remains of a hemiplegia, and an enormous adiposity. Stolper spoke of a case in which after a fall upon the back of the head an acromegaly had developed. The patient died, and the autopsy revealed the hypophysis unusually large and œdematous, and a metastasis in the right occipital lobe. Injury to the pituitary body may be caused by fracture of the base by the penetration of foreign bodies, by gunshot or stab wounds. V. Eiselsberg conducted a series of experiments to determine the effect of extirpation of the hypophysis, but the animals died soon after the operation.

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[1] Archiv f. klin. Chir., Band lxxiv., Heft. 1.

INFECTION.

Cerebral Infection. In his address in "Surgery," delivered before the British Medical Association, Sir William Macewen[1] expressed his views as to the localization of cerebral abscesses and the avenues by which the infection travelled to the brain. Abscess of the brain was once regarded solely as of a pyæmic nature, occurring by metastasis, and, owing to the aberrant manner in which abscess happened to occur, in parts which gave rise to functional manifestation. In the light of his later experience he believes this view to be erroneous. All brain abscesses arising from foci within the cranium are, if not in direct contact with such foci, at least in contact with the infected path between the two. Knowing the primary pyogenic focus, one can count upon the abscess being situated within a circumscribed radius of that point. In the great majority of cases in which brain abscess has formed from primary foci in the exterior of the skull, the abscess is situated in direct contiguity with the infected structures. Anatomical features generally determine the particular direction in which the pyogenic organisms proceed from the primary focus of the brain. Thus, for example, in the case of an intracranial abscess resulting from middle-ear disease one knows that the abscess is well from within a limited area of the ear, and, furthermore, that its location will be influenced by the path of extension. When the latter is by way of the internal meatus a basal meningitis results; when the tegmen or the sigmoid sinus is invaded, a local meningitis or abscess of the cerebrum or cerebellum follows. Abscess of the brain seldom or never occurs by pyogenic organisms travelling by way of the internal auditory meatus. The anatomical features of the part make this unlikely. The brain is kept apart from the original focus by the whole length of the internal auditory canal. The exposures of the brain membranes, which ensheath the nerves in the canal, dip right into it. A leptomeningitis is thus set up, and spreads to the basal membranes. Macewen has seen ten cases of tuberculous meningitis in which the middle ear was involved without perforation of the tympanii membrane. In five of these intracranial operations were performed, with the hope that the process was still localized, and this proved to be the case in three. These cases not only recovered from the operation, but regained strength and vigor. In suspected cases of tuberculous meningitis one should always look for the original tuberculous focus. It may easily be overlooked and even in post-mortem examination a casual examination of the interior of the skull might overlook the channels of extension, and, therefore, the primary focus might remain undiscovered. Tuberculosis of the middle ear may give rise to disseminated lesions through the sigmoid sinus; the tuberculous granulation tissue may invade the sinus and thus gain entrance to the general circulation.

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[1] British Medical Journal, July 30, 1904

CRANIAL TUMORS.

Lumbar Puncture. This is a dangerous procedure when applied in cases of brain tumors, and especially those cases in which the communication between the cerebral ventricle on the one hand and the subarachnoid space and central canal of the spinal cord on the other is interrupted. Under these conditions the equilibrium between the spinal and cerebral fluid is disturbed, and there is danger of directly injuring the medulla oblongata. In one case a wedge-shaped piece of cerebellum was forced into the foramen magnum. Not only is the procedure dangerous under these circumstances, but it will be useless, since, when the communication with the cerebral ventricle is cut off, one cannot reduce the intracerebral pressure. Before 1900 Gumprecht collected fifteen cases of sudden death after lumbar puncture for cerebral tumors. Another fatal case is reported from the Dorpat Clinic by Masing.[1] About 30 c.c. of cerebrospinal fluid were withdrawn, reducing the pressure to zero. Before the operation was completed the patient suffered from nausea and intense headache; she died fifteen hours later. At the autopsy it was found that death was due to cerebral hemorrhage, which it was supposed was brought on suddenly by lowering the blood pressure.

Gayet[2] reports another case of lumbar puncture for a cranial tumor, in this instance, of the occipital lobe. The operation was performed for the relief of headache, and, although the patient's general condition was excellent at the time, she died one week later. The headache was relieved only temporarily and to a very slight degree, but soon became more intense than ever.

Surgical Aspects of Brain Tumors. In a paper[3] upon the surgery of tumors of the brain I pointed out a number of observations and conclusions drawn from my operative records. The greater attainments in more recent years are, I believe, to be attributed to an earlier recognition of the tumors; to a correspondingly earlier resort to operation; to more accurate localization, and, finally, to certain distinct improvements in technique, to wit: a speedier method of opening the skull, the exposure of a much larger area than was possible before the introduction of the osteoplastic flap, and the adoption of the two-stage operation in these cases in which the blood pressure is materially reduced by the preliminary procedures. Many of the improvements or modifications of technique in operations upon the brain have in view a common object, the prevention of shock. "All measures recognized as prophylactic of shock should be observed stringently. In these we have the most effectual means of reducing the mortality. The most important of them are: (*a*) the avoidance of prolonged operation, (*b*) the prevention of excessive hemorrhage, and (*c*) the avoidance of unnecessarily rough manipulation of the brain substance." Since the element of time plays such an important part in the results of brain operations, that method should be used which will expose the growth in the shortest time. With the electric engine and drill, which I use in all my craniotomies, a given area of brain can be exposed with the least degree of traumatism and the greatest economy of time. A considerable amount of blood will be lost in these operations, even before the tumor is exposed, unless some measures be adopted to prevent it. Crile's method of temporarily closing the carotid should be reserved for extreme cases, and practised on one side only; it is not unattended by danger, and is ineffectual in that it controls only arterial but not venous hemorrhage. The posture of the patient during the operation should not be overlooked. Hemorrhage will be less free if the patient's head and body are well elevated. It is a very good plan to make the incision section by section, stopping to control the hemorrhage from one section before proceeding to the next. Observations should be made upon the blood pressure immediately before and at frequent intervals during the operation. The object of this is twofold. In the first place, it is the most reliable index of the patient's condition. When the normal blood pressure is sustained throughout the operation we are assured that the operative procedures have not been of sufficient gravity to induce shock. This applies, of course, to operative procedures generally, and is not confined to those upon the brain; but in operations upon the brain the blood-pressure index is of much greater significance in that it assists us in determining whether the operation should be performed in one or two stages.

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[1] St. Petersburger med. Woch., No. 1, p. 1.

[2] Revue française de médecine et de chirurgie, 1904, No. 55.

[3] American Journal of the Medical Sciences, February, 1904.

Von Bergmann recommends the two-stage operation in cases in which the patient's general condition was below par, or in which the tumor was a very large one, while Horsley recommends its adoption in every case without exception. It seems to me that the former's recommendation is too indefinite and the latter's unnecessarily radical. A rule may be formulated which is based on a more scientific basis, namely, that when after the relief of pressure such as would follow the removal of the osteoplastic flap and the reflection of the dura, there is a very decided fall in the blood pressure, an attempt should not be made at that sitting to remove the tumor. Lumbar puncture, as a means of relief of pressure, is a procedure not only dangerous, but affords only temporary relief. A considerable number of fatal cases have been reported in which lumbar puncture has been practised for the relief of tension in the presence of cerebral tumors.

Bulging of the brain is the most embarrassing feature of cerebral operations. A distinction must be made between that which occurs immediately after the reflection of the dura which I have termed "initial" bulging, and that which follows as a result of subsequent exploratory manipulation, namely, "consecutive" bulging. Initial bulging is due to the increased tension exerted by a tumor. It is not always present, it is often not excessive, and is not likely to be followed by consecutive bulging. Consecutive bulging is due to the cerebral œdema set up in normal brain tissue by the trauma inflicted by exploratory manipulations. It exceeds in magnitude initial bulging, and suggests the absence of a tumor of considerable size at the seat of operation. If a tumor was present at the area of the brain exposed, unless existing under great tension, there would naturally be no bulging, and it is quite natural to assume that manipulations of the growth would not give rise to an œdema, which accounts for the bulging in normal brain tissue. In order to avoid this consecutive bulging, which is, to say the least, the most embarrassing feature of these operations, exploration should be carried out in the most expeditious manner, and there should be as little handling as possible of the exposed cerebral tissue. When the edges of the dural wound cannot be approximated without undue tension or without great laceration of brain substance, the gap should be closed by a graft taken from the pericranium, providing the tumor has not been found and there is reason to question the accuracy of the diagnosis. When there is every assurance of a tumor being present, but it proves to be inoperable or was imperfectly localized, no attempt should be made to close the dura, as in so doing the best possible palliative effects of the operation would be counteracted. Palliative operations should be regarded not merely as operations of propriety, but should be considered imperative whenever the tumor cannot be found or cannot be removed. A statistical study of the results of the last five years is encouraging. The mortality, both immediate and subsequent, has been reduced materially. Recurrence after operations for malignant growths of the brain is no greater than after operations for malignant growths of other structures.

The records of four operations for brain tumor are appended, and illustrate a number of points to which attention has been drawn.

Tumor of the Lateral Ventricle. McCosh[1] performed a craniotomy upon a patient of Dr. Ledzynsky, who was supposed to have a tumor of the superior parietal convolution. The presence of complete astereognosis and the absence of paralysis pointed to a lesion in that region. But in addition there were evidences of intense intracranial pressure, such as headache, vomiting, delirium, pāpillitis, and blindness, and also evidence of an irritative disease affecting the right Rolandic area. When the dura was reflected the brain bulged forward very prominently; a hollow needle was inserted, and at the depth of one and one-half inches withdrew about two and a half ounces of clear, straw-colored fluid. Upon withdrawal of the fluid the brain collapsed within its normal boundaries; the dura was sutured and the flap replaced. The patient died four weeks after the operation from lobar pneumonia, and at the autopsy a tumor about the size of an egg was found springing apparently from the wall of the ventricle. Two organized clots were found in the ventricle. Although the tumor was not found, the pressure and irritation symptoms were relieved by the continuous and abundant escape of cerebrospinal fluid.

Sarcoma of the Brain. The patient exhibited signs of a localized lesion, which was chiefly convulsive in the left arm, sometimes extending to the leg, leading to hemiparesis, associated with high-grade choked disk. The lesion was supposed to be either a traumatic cyst or a tumor. At the site of a scar, which was the result of a previous accident, Lufman[2] opened the skull, and found a spindle-cell sarcoma about the size of a walnut. Fourteen days later the convulsive seizures recurred, and the dura was laid open again and more tissue excised. At first the results were exceptionally good, but later several epileptic seizures and paresis of the right arm and right leg supervened; a hernia cerebri developed, and the growth recurred. The development of the sarcoma at the site of the original injury suggests the influence of trauma upon the etiology of the tumor.

Tumor of Optic Chiasm. Quite a large number of tumors of the optic chiasm have been reported. A large number of these are associated with acromegaly. I know of no case in which an attempt has been made even to expose a tumor of the chiasm. Kiliani[3] reports a case of tumor of the chiasm in which he had intended to make the attempt to explore and remove the tumor, but a day or two before the operation was performed the entire clinical aspect of the case suddenly changed. It was thought that the additional symptoms were due to rupture of the tumor and to a hemorrhage into the lateral ventricle. On this basis an osteoplastic flap was reflected and the ventricle punctured. No blood was found, however, and the patient died a few hours after the operation. The autopsy revealed a tumor of the hypophysis the size of a plum. The author made some observations on the cadaver with reference to the feasibility of reaching tumors of this region. He states that it would be impossible to reach this region by the temporal route. "Even if we should succeed in reaching the anterior foramen lacerum, between the carotid canal and the foramen ovale, we would find ourselves behind the sella turcica, in fact, behind the processus clynoidus posterior." Several years ago the author tried to apply a modified operation after Kronlein's method for reaching the rear parts of the orbit by combining it with a large frontal flap. It was intended to reflect downward the frontal flap, and to bring with it the entire upper roof of the orbit. This was tried in one case, but the operation had to be discontinued, as it was found impossible to break the bone in the way above described. From his experience Kiliani believes it impossible to reach the chiasm by any extradural operation, chiefly because of the density of the attachments to the dura. The following method he believes to be the only rational one: It consists essentially in the reflection of a Wagner flap of omega shape; the base lies about one-half inch behind the coronary suture; the flap would measure five inches in the median line, seven inches in width, and three and a half at the base. After the reflection of the bony flap the longitudinal sinus, which at this point is not larger than a medium-sized vein, is ligated and a dural flap fashioned. With this exposure the frontal lobe can be elevated and the optic nerve exposed without any difficulty. If a tumor be found the method of removal will depend somewhat upon its character. As a rule, most of the tumors are benign and easily excised with a sharp spoon; some are cystic, and, therefore, easily evacuated, and, finally, others may be malignant The latter offer naturally the greatest obstacles.

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[1] Medical Record, January 30, 1904.

[2] Berliner klin. Wochenschrift, No. 36, 1904.

[3] Annals of Surgery, July, 1904.

Sarcoma of the Dura Mater. An extensive operation was performed upon one of Griffith's cases[1] for the removal of a rapidly growing sarcoma of the dura. Two months later the growth recurred; the *x*-rays were applied and Coley's toxins injected into the back and directly into the tumor, but without any effect. The growth covered the whole top of the brain and elevated the vault of the skull, but despite the immense proportions of the growth the patient suffered comparatively little discomfort.

In the Augusta Hospital, Müller[2] has met with two cases of sarcoma of the dura in the occipital region. Both cases appeared in young men about the age of twenty, in whom the tumor had burrowed through the skull directly at the torcular herophili. The operation was in both cases divided into two stages, at first removing the overlying bone, then extirpating the tumor. In the first case it was necessary to ligate in two places and resect about 5 cm. of the straight or lateral sinus and a portion of the tentorium. This large defect was later covered with bone and healed satisfactorily. In the second case it was necessary to throw a double ligature around the transverse sinus. The operation was carried out at one sitting, and the patient died on the fourth day. In the first case a hemianopsia developed, which was attributed to the traumatic softening of the right occiptal lobe; in the second case, soon after the operation, a central scotoma developed and led to bilateral amaurosis.

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[1] Medical Record, May 9, 1903.

[2] Zentralblatt für Chirurgie, No. 25, 1904, p. 766.

Angioma of Pia Mater. Bail[1] reports an unusual form of tumor of the brain occurring in a boy aged ten years. The patient in December, 1902, had a fall and struck the back of his head, without giving rise to any evidence of concussion. Two weeks later unilateral spasms appeared and still later there were evidences of choked disk. At the operation Krause found in the region of the left anterior central fissure the veins of the pia very much distended, confluent, and tortuous, involving a portion of the brain about 4 cm. in diameter. The thickened veins of the pia were ligated at the periphery and divided. The puncture and exploratory incision of that portion of the brain failed to find any tumor. After the operation the convulsions ceased, the choked disk disappeared, but the weakness which was present before the operation remained. The case was regarded as one of beginning angioma of the pial veins.

Cerebellar Tumors. NEUROFIBROMA OF THE ACOUSTIC NERVE. This contribution to the surgery of neurofibroma of the acoustic nerve by Hunt, Fraenkel, Woolsey, and Elsberg[2] is based upon the report of two cases, in both of which the diagnosis was correct and in both, unfortunately, the operation was a fatal one. As to the symptomatology one would expect the initial and most important symptom to be referable to a disturbed function of the auditory nerve. The growth of a neurofibroma is slow, and the conductibility of the nerve fibres is maintained for a considerable time. When signs of disturbance of the function of the nerve make their appearance the lesion might be suspected, although a certain diagnosis would be impossible. Not until the tumor grows and presses upon adjacent structures, as the pons, medulla, cerebellum, and nearby cranial nerves, can these tumors be recognized. The symptoms may be arranged in three groups: 1. General: headache, vertigo, vomiting, optic neuritis, bradycardia. 2. Focal: peduncular ataxia, cerebellar ataxia, lateroexpulsion, hemiasynergy, homocontralateral and crossed paralyses of the extremities; paralysis of the basilar cranial nerves, especially the seventh, sixth, and fifth; dysarthria, dysphagia, nystagmus, paralysis of the conjoint movements of the eyes, inequality of the pupils, and attacks of Adams-Stokes syndrome. 3. Special: serious impairment of the function of the auditory nerve of long standing and gradual onset. The first case, reported by Hunt, is that of a man, aged fifty-two years, whose history and condition is summed up as follows: Onset and initial symptom six years before, with tinnitus aurium and slowly progressive diminution of hearing in the left ear; two years later a tendency to stagger, occipital headaches, vertiginous seizures, and fainting spells. Up to the year previous to admission all the symptoms had gradually increased in severity. There was marked disturbance of the gait and equilibrium, and deafness in the left ear. Severe occipital and frontal headaches with vertigo and failing vision were also present. The symptoms on admission were cerebellar and peduncular ataxia, with a tendency to fall backward and to the left. There were also double optic neuritis, lateral nystagmus, dilated and unequal pupils, dysarthria, paræsthesia, and objective sensory disturbances in the distribution of the left fifth nerve, paresis of the left seventh, with electric changes, and nervous deafness in the left ear. Based on the duration and chronological relation of the symptoms, the clinical diagnosis of a neurofibroma of the left acoustic nerve was made. The operation was performed by Woolsey. The usual opening in the skull for cerebellar lesions was made, and on reflection of the dura the hemisphere bulged considerably. The seat and size of the tumor was easily made out by digital exploration; it was hard and nodular, and could easily be distinguished from the surrounding brain tissue. It was not thought feasible to remove it entire; hence it was removed piecemeal. This necessitated the frequent introduction and removal of the fingers, which caused some laceration to the cerebellar tissue. A large cigarette drain was introduced down to the seat of the growth and the wound closed. During the removal of the growth the respirations became irregular in rhythm and depth. About three hours after the operation the patient went into collapse and died. The autopsy showed that death was due to hemorrhage within the left middle peduncle of the pons, and Woolsey was convinced that this was due to the traumatism indispensable to the frequent introduction and withdrawal of the finger, especially in withdrawing the finger, as it had to be bent at the end to remove the fragments. The operator believes that it would have been possible and very much safer to introduce a curved vulsellum forceps along the finger, and, seizing the tumor, to remove it *en masse* after the finger had been withdrawn. Had this procedure been adopted the fatal injury to the pons might have been avoided. The tumor was approached from a posterolateral rather than posterior direction. By this route the distance to the cerebellopontile angle is shorter than from any other point in the cranial surface, and an excellent exposure of the tumor and the field of operation is obtained. It is an open question, however, whether this holds good in the living subject, since the increased intracranial pressure causes such a bulging in all directions that the condition differs materially from those on the cadaver. In Woolsey's opinion the surgical removal of these tumors is quite feasible, and its successful performance may be expected in a fair proportion of cases.

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[1] Zentralblatt für Chirurgie, 1904, No. 25.

[2] Annals of Surgery, September, 1904.

The report of the second case was made by Dr. Fraenkel, and may be summarized as follows: Male, aged forty-eight years. Disease began five years ago, with progressive diminution of hearing on right side. One year later difficulty of locomotion. Right lower extremity affected first. One year later increase of locomotion difficult; gait of drunken man. Transient diplopia and propulsion. Two years ago noticed the occurrence of an ankle clonus. Since two years impairment of vision and difficulty of speech and ataxia. Since one year sphincteric difficulties. On examination static and locomotor ataxia; falls and inclines to left side; tenderness in right mastoid region; some mental apathy; stammering speech; bilateral choked disk; nystagmus; paralysis of right side of face (developed four months after admission); motor paresis and spasticity of left-sided extremities; some spasticity of right side and marked right-sided ataxia. The diagnosis of neurofibroma of the acoustic was the only one possible to reach. In view of the fact that the optic neuritis had not reached a stage incompatible with the expectation of improvement, operation was advised. A preliminary craniotomy was performed by Elsberg, but, unfortunately, the patient died in uræmic coma forty-eight hours later, and the autopsy confirmed the accuracy of the diagnosis. Speaking more in detail of the operation, Elsberg calls attention to the fact that in reflecting the dura the cerebellum bulged more than normal, and its pulsation was only slightly visible. It was decided in this case to divide the operation into two stages. Accordingly, after the bone was removed, the cutaneous flap was replaced and the patient returned to the ward. At the conclusion of the operation the patient's condition may be said to have been fair, although his pulse began to weaken as soon as the incision in the soft parts had been made. In spite of energetic treatment the kidneys of the patient failed to respond and he gradually went into a uræmic condition, became comatose, and died forty-two hours after the operation. The opening in the skull in this case was somewhat larger than usual, extending above the level of the lateral sinus, and well into the mastoid cells. Elsberg believes that this gives a better opportunity for the exposure and necessary manipulations for tumors of the anterior and lateral parts of the cerebellum. The posterior or occipital route is objectionable, first, because it is not the shortest route from the surface of the skull; secondly, because the manipulations in the removal of the tumor have to be done by the sense of touch alone; thirdly, because even with the most gentle manipulations the cerebellum is apt to be considerably contused and its tissues injured; and lastly, in the digital examination of the anterior parts of the cerebellum from the posterior surface of organ the finger must come in frequent contact with the medulla and the pons. The great danger from only slight injuries to these structures is well known. In measuring a number of skulls to prove these points, Elsberg found that the distance from the outer surface of the occipital bone below the level of the lateral sinus to the anterior edge of the cerebellum diminishes steadily as one makes measurements more and more distant from the median line. On the cadaver, if an opening in the skull is made in the mastoid region and the dura incised, the lateral edge of the lateral lobe of the cerebellum falls away from the posterior surface of the petrous portion of the temporal bone, so that one-half of this part of the bone can be seen, and with only slight retraction of the lateral lobe can be drawn sufficiently toward the median line to expose the auditory and facial nerves. In summing up the conclusions drawn by their observations upon these cases the authors say: "We believe that the acoustic tumor syndrome is well defined, and that the diagnosis can be made with practical certainty. This presupposes not only the diagnosis of the location of the tumor, but its nature and comparative size. It must, however, be observed that other slowly growing pathological conditions in the posterior fossa might simulate closely this condition. The slow and essentially benign nature of the growth, its non-infiltrating character, and enucleability would all favor surgical interference. The deep situation at the base in immediate proximity to vital centres offers *very serious obstacles*. From personal observation we believe that the surgical technique should be perfected along the following lines: The avoidance of undue concussion in the removal of the bone and enlargement of trephine opening; a method of extirpation by which the tumor could be extirpated without undue manipulation of the surrounding parts; the division into stages, as recommended by Horsley, and celerity of execution. The study of the literature of this subject is unsatisfactory, because most of the cases are recorded under the heading of cerebellar tumors.

Fry reports a case of cerebellar tumor which was removed by Dr. Mudd.[1] The tumor, a conglomerate tuberculous growth, was situated in the substance of one of the hemispheres and was easily enucleated. A little over a year after the operation the patient reported himself as hearty as a harvester, although all the symptoms had not entirely disappeared, and a hernia cerebelli had developed. Mudd recommends the insertion of a silver plate to prevent the development of a hernia.

CRANIAL SINUSES.

Sinus Pericranii. This lesion, which is a very rare one, was first described by Stromeyer as a tumor under the pericranium, containing venous blood and in communication with the cerebral sinuses, either directly or through the medium of the channels in the cranium. Littauer[2] reports a case of this character which is only the tenth to appear in literature. Two weeks after the patient had received a blow on the head, which at the time did not seem to be serious, he noticed a soft swelling in the right temporal region. The swelling appeared only when he was in the stooping posture, and disappeared when he assumed the erect posture. The lesion was attributed by the author to a rupture of a diploic or emissary vein, in which repair of the wound was prevented by the formation of dense adhesions between the vein and the adjacent structures.

Cavernous Sinus Thrombosis. A very valuable contribution to the surgery of the cavernous sinus by Dwight and Germain was reviewed in the March issue of PROGRESSIVE MEDICINE, 1903. These authors were the first to demonstrate that this sinus was not, as formerly supposed, inaccessible, and that a thrombosis of the sinus could be treated by the same surgical principles as applied to the lateral sinus. Roth[3] reported three cases of cavernous sinus thrombosis all of which terminated fatally without any attempt at relief by surgical intervention. The primary cause was in each instance trivial: in one a carious tooth, in another a furuncle on the nose, and in a third a furuncle on the upper lip.

Thrombosis of the Sigmoid Sinus. In Bacon's case[4] the thrombosis was attributed to an injury to the sinus during a mastoid operation. A week after the operation the patient became septic, the wound was reopened, and a thrombus was found in process of formation and removed. Recovery was uneventful. Inasmuch as the clot had not broken down, Bacon did not think it necessary to ligate the internal jugular vein.

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[1] Journal Nervous and Mental Diseases, March, 1904.

[2] Berliner klin. Wochenschrift, May 30, 1904.

[3] New York Medical Journal and Philadelphia Medical Journal, February 27, 1904.

[4] Ibid., October 1, 1904.

CRANIAL NERVES.

Trigeminal Neuralgia. There were three papers upon this topic, each containing some features of interest, presented to the Surgical Section of the American Medical Association. Sherman[1] reported his experience in four cases, in two of which the results were unconventional and in two exceptional. The exceptional element in one of these was a paralysis, complete and permanent, of the facial nerve, noted first the morning after the operation. Sherman was quite sure that the nerve could not have been subjected to traumatism during the operative procedures, since the zygoma was not excised, and the nerve therefore well protected. The exclusion of trauma to the nerve in its superficial location put the case outside that class of which Pershing wrote, and to which Wyeth has referred, in which pressure or a pull on a superficial nerve during the period of anæsthesia resulted in temporary or permanent paralysis. The integrity of the nerve before the operation and the lack of any pathological ear or temporal bone process makes it most probable that some injury inside the skull caused the paralysis. Finally the operator was quite sure that he did not injure the nerve in the posterior fossa before it entered the petrous bone, so that he is quite at a loss to account for the facial paralysis.

The exceptional point in the second case was return of sensation and pain after division of the sensory root. For two days the man was free from pain and there was paralysis of the temporal and pterygoids, and on the third day the pain and sensation began to return, but the paralysis of the pterygoids persisted. Sherman is quite positive that he cut the root and concludes that the fifth nerve may unite and resume its physiological function. This result is quite contrary to the findings of Spiller and myself. Our investigations upon this subject, both experimental and clinical, seemed to prove beyond a doubt that regeneration was impossible. It seems to me within the range of probability that Sherman failed to sever the nerve completely, because of the early return of sensation. Had he reported a return of sensation weeks or months after the operation, one might then have some grounds for asserting that the nerve had undergone regeneration, but very grave suspicions are aroused at once when restoration of function is reported as having occurred on the third day.

Spiller[2] and myself have contributed a further report on division of the sensory root for *tic douloureux* based upon the observation of four cases. The advantages of this procedure over other procedures which have been substantiated by clinical experience are: (1) that it minimizes the amount of hemorrhage; (2) that its execution is comparatively simple; (3) that the adjacent structures (cavernous sinus; third, fourth, and sixth nerves) are not exposed to injury; and (4) that the mortality should be lower. The technique of the operation is practically the same as that for the extirpation of the ganglion up to the stage at which the superior aspect of the ganglion is exposed. The operation is completed by picking up and dividing the sensory root. Considerable importance has been attached to what has been called the infra-arterial route and the danger of injury to the middle meningeal artery. This, however, has been grossly exaggerated. One familiar with the great variation in the course of the middle meningeal artery and its relation to the temporal and frontal bone realizes at once the futility of attempting to establish a point below which one can operate always with the assurance that the vessel will not be injured. The danger of injuring the middle meningeal vessel in opening the skull is due to the fact that the vessel sometimes runs in a bony canal, sometimes in a deep channel. When the fragment of bone is removed the vessel is lacerated. Sometimes there is no canal at all; usually the canal begins sufficiently high to escape injury; exceptionally, however, the canal begins so far down that it would be impossible to make an opening large enough to enable one to carry out the necessary manipulations on the ganglion by the so-called infra-arterial route. Common sense prompts one to make the opening as near the base of the skull as possible, not especially to avoid the artery, but in order to reduce to a minimum the distance from the margin of the skull to the ganglion and to make the opening only as large as the manipulation may require. No other directions to the operator are necessary; he avoids injuring the artery if he can, and if he cannot it is a matter of no difficulty to control the hemorrhage.

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[1] Journal of American Medical Association, October 1, 1904

[2] Ibid.

Van Gehuchten has published recently[1] a most instructive and interesting paper on the "Surgical Treatment of Trifacial Neuralgia," in which he discusses somewhat at length the effects of division of the sensory root. Owing to the fact that he believes this operation to be as radical in effect as extirpation of the ganglion, he has styled the former "physiological extirpation" of the ganglion and regards it as both less dangerous and more complete than the operation of Krause. Every fibre of the central nervous system, he says, attacked by secondary degeneration is a fibre inevitably lost. The nerve fibres of the central nervous system interrupted at any part never regenerate. The section of the large root of the trigeminal nerve is equivalent, then, at least as regards its effects on the bulbospinal root, to the destruction or extirpation of the Gasserian ganglion itself. Whether the cause of the trifacial neuralgia resides in the semilunar ganglion, or in one or the other of the three peripheral nerves, at the moment we interrupt completely all communication between the ganglion and cerebrospinal axis we destroy inevitably the route by which painful impressions are conveyed to consciousness. The section of the large root of the trigeminal nerve, even though it does not constitute an anatomical extirpation of the semilunar ganglion, is equivalent, then, to a true physiological extirpation, and is the only one which is of importance in point of view of treatment of trifacial neuralgia. This physiological extirpation is not only more complete and easier to accomplish than the tearing out of the ganglion recommended by surgeons, but it has an advantage over this mode of operation which is not to be despised. It leaves intact the connections of the ganglion with the peripheral organs.

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[1] Le Nevraxe, vol. v.; University of Pennsylvania Medical Bulletin, April, 1904.

Noteworthy in the experience of Spiller and myself have been the absence of ocular disturbances. Although no especial pains have been taken to guard against corneal ulceration, this complication has not occurred. Spiller says it is probable that sympathetic fibres pass to the eye after entering the trigeminal nerve through the Gasserian ganglion, and as in division of the sensory root these fibres are not injured the danger of ocular disturbance by this operation is lessened. The trophic influences of the ganglion in the eye may depend possibly on the integrity of these sympathetic fibres, but it is probable that these fibres are not so numerous in man as in lower animals.

Van Gehuchten, in his recent contribution to the treatment of trifacial neuralgia, recommends the tearing out of the peripheral branches, a procedure which, he says, is simpler and much more easily executed than intracranial resection. This recommendation is based on the following phenomena: Simple division of a cranial nerve nearer to or farther from the base of the cranium is followed by degeneration of all the cells of origin, but with complete integrity of all or almost all of the fibres of the central end. This degeneration is only temporary, however, and is soon followed by reparation of the nerve and restoration of its function. Tearing out of the nerve, on the other hand, produces reactional phenomena much more intense; the degeneration that follows soon becomes an achromatosis, and this, in turn, is followed by atrophy and disappearance of all the injured cells. These phenomena have been observed only in motor nerves, and to prove whether sensory nerves would be affected in a similar manner, experiments were conducted on rabbits; the three peripheral branches were seized with a hæmostatic forceps at their exits from the supraorbital, infraorbital, and mental foramina and torn away. The results were positive; not only was there atrophy of the cells of the ganglion, but Wallerian degeneration of its bulbospinal root. As regards the technique of the operation, the nerve should be freed as far as possible from all its connections and seized as near as possible to the base of the cranium in order to make the resulting traumatism more intense. In reviewing the literature of the subject, Van Gehuchten found that this operation had been recommended and practised by Blum in 1881, and later by Doyen. There seems to have been some apprehension on the part of surgeons that there was danger, in employing the force necessary to tear the nerve, of inflicting some serious injury upon the brain centres. In any other cranial nerve this complication might occur, but the Gasserian ganglion is so firmly attached to the base of the skull that this accident could not be considered possible. These observations of Van Gehuchten are certainly worthy of the surgeon's consideration. If avulsion of the nerve will result in such degenerative changes of the ganglionic cells and the bulbospinal root that restoration of function is impossible, this operation should be practised as a substitute for the intracranial operations. Whether or no surgeons at large would be willing to practise in those cases in which a so-called central operation is indicated, it should at least be given a trial, when circumstances call for a peripheral operation; that is to say, instead of resecting a portion of the inferior dental or infraorbital nerve, the nerve should be forcibly torn away. If Van Gehuchten's observations are correct, it is reasonable to assume that there would be less chance of recurrence in the case of the latter than of the former operation. Not, of course, until this operative procedure has been proven successful in its application on the human subject can it claim the support of the surgical profession. Thus far, with the exception of a few isolated cases, it is supported only by the results of experimentation on rabbits. Davis, in 1898, operated on a case in which this idea of Van Gehuchten was put into practice, but with unfavorable results. The superior maxillary nerve was exposed as it ran from the Gasserian ganglion. The nerve, as it entered the bone, was grasped with a hæmostatic forceps and pulled upward; with another forceps the nerve was grasped closer to the ganglion and twisted loose from it. The relief which followed the operation was only temporary; the pain gradually returned and became so severe as to require a more radical operation. In commenting on the case, Davis says the explanation of the return of pain is left to the experts. The operation was practised in the manner prescribed by Van Gehuchten; it might be claimed that the twisting out of the nerve was not sufficiently violent or brusque, but this view is hardly acceptable.

Apparently without any knowledge of the investigations upon the sensory root operations, which have been carried on for the past four years and very generally discussed in the medical press both in this country and in Europe, Gordon, of Dublin,[1] puts forth the following as an original suggestion: "If the entire sensory root has been successfully torn from its attachment to the pons, nothing is more improbable than that the ganglionic cell should ever again establish a central connection. It seems then to me that the chief aim which the surgeon should have before him in performing this operation is the isolation and complete evulsion of the sensory root. You will remember that in the operation, as usually performed, the space of Meckel is opened by splitting the dura between the foramen rotundum and the foramen ovale, and the dissection of the ganglion is carried out mainly from before backward. Thus it happens that the operator reaches the sensory root as a final step in the operation, and when his mind is much fatigued, especially if, as in this case of mine, the dissection has been difficult owing to hemorrhage. My suggestion is that Meckel's space should be opened from the foramen ovale in a backward instead of a forward direction. The middle meningeal artery must, of course, be divided, but this is a matter of no importance. Having opened the space in which the ganglion lies in this way, I propose, in my next operation, to at once proceed to the identification and separation of the sensory roots. If, then, the evulsion is well done, I think one might leave both the ganglion and the nerve divisions untouched. Having put forth this suggestion, the main purpose of my paper is accomplished. The suggestion is briefly this: A complete evulsion of the sensory root will produce the same effect as removal of the ganglion, and the effect will be permanent. This being so, the operator should from the first aim at the isolation and evulsion of this sensory root, and it might simplify the operation to open the space of Meckel behind the foramen ovale and third division of the fifth nerve, instead of in front of it."

OSMIC ACID TREATMENT. About a year ago Murphy reported his experience with this treatment of a case of trigeminal neuralgia by intraneural injection of osmic acid—a mode of treatment recommended by Mr. W. H. Bennett in 1899. More recently Murphy[2] has carried on a series of investigations, both experimental and clinical, to prove the effectiveness of this procedure, chiefly because of the serious character of the intracranial operations. In the twelve intracranial operations which he has performed the mortality was 33⅓ per cent. This rate of mortality is much higher, I believe, than that based upon the results of surgeons generally within the past five years. The technique has been so thoroughly elaborated that the operation is no longer regarded as one of a very serious nature. Out of 120 cases Horsley had but 3 deaths, a mortality of 2½ per cent. From Murphy's experiments and clinical experience he draws the following conclusions:

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[1] The Medical Press, March 30, 1904.

[2] Journal of the American Medical Association, October 1, 1904.

That trifacial neuralgia, *tic douloureux,* is not the result of a pathological entity which has so far been definitely determined. The tendency after all types of operation, with the possible exception of removal of the sensory root behind the ganglion, is to recurrence of the disease. This is probably due to the regeneration of certain nerve elements following the deep operation, and anastomosis and retention following the superficial. Sudden shocks and irritation to the terminal filaments of the trifacial not infrequently cause an immediate and occasionally a permanent cessation of the neuralgic pain. The mortality from the superficial exsections is practically *nil;* the mortality from the intracranial operations is great. The hazard is greater than should be taken in a disease which does not in itself jeopardize life. Injections of osmic acid in 1 to 2 per cent. solution into the nerve trunks relieve the pain immediately and in a large percentage of cases for a long period of time. The injections into the superficial tissue for peripheral neuralgia should be abandoned, as the nerve trunks are easily located, and there is no danger of superficial necrosis following such operation. It should never be injected into a motor nerve or a motor-nerve area, and, therefore, never into the spinal nerves, except in amputation stumps. It produces a local necrosis of the tissue into which it is injected, and even of the wall of the foramen. This necrosis does not suppurate unless the area is exposed to mouth infection. In that case the suppuration often continues for weeks, draining into the mouth, giving no special inconvenince, and in no way interfering with the final result. The best results are obtained with a 1½ to 2 per cent. solution; this should be injected in many places into the nerve trunk and also into the foramen. All of the nerve branches should be injected—the palatine, lingual, mandibular, superior maxillary (infraorbital), and supraorbital. They can all be exposed through mouth incisions except the supraorbital. Many times there are three or four divisions of the supraorbital, and they should be searched for carefully and each injected. Occasionally it is necessary to inject the auricular branch. The posterior palatine is not so difficult to inject as one would at first imagine. The foramina can and may be injected without anæsthesia or incision. The procedure is quite painful, however, and is not certain in its results. The injections can be made with local or general anæsthesia. I prefer the general. The injection is free from danger. Judging theoretically from the experience with incisions, resections, and ganglion operations, the relief *should not be permanent after the injection of the osmic acid.* From clinical experience up to date, however, and particularly from Mr. Bennett's showing, the fact is that many cases *are* permanently cured. Time alone must determine the final result of this treatment. Its ease of application, its *nil* mortality, and its immediate results forcefully commend its use.

Eastman[1] treated a case successfully with injections of osmic acid. A 2 per cent. solution was injected into the supraorbital, infraorbital, and dental nerves. The symptoms abated one week after the operation, and have not recurred.

According to Wright,[2] Billroth and Neuber were the first to employ osmic acid for neuralgia. They used repeated injections through the skin without exposing the nerve. Wright believes the method should have a further and extended trial, and has himself employed the method in a series of twelve cases. The immediate results as regards the harmlessness and at least temporary relief quite justify the use of the plan before resorting to such a severe procedure as excision of the Gasserian ganglion. Most of his cases are much too recent to attempt to draw any conclusions as to the permanent value of the method. His results were as follows: 1. Fifth nerve; improved; two and three-quarter years since operation. 2. Cervical; great improvement; three and one-half years. 3. Testicle; improved; two years. 4. Fifth nerve; one attack since; otherwise better; fourteen months. 5. Fifth nerve; relieved; one year. 6. Tibial; failure; ten months. 7. Fifth nerve; much relieved; ten months. 8. Fifth nerve; relief; lost sight of. 9. Fifth nerve; failure. 10. Fifth nerve; relief; three months. 11. Cervical, with torticollis; temporary relief; two weeks. 12. Fifth nerve; well; two months. 13. Fifth nerve; well; six weeks.

Excision of Gasserian Ganglion. Schwartz[3] reports two cases of excision of the Gasserian ganglion according to the Krause method. The first case was a woman, aged forty-two years, who had previously undergone an operation for the avulsion of the infraorbital nerve and a resection of the superior maxillary nerve at the foramen rotundum. The second was a man, aged sixty-four years, who had undergone several peripheral operations. The author carried out the technique of Krause with one modification, namely, the preliminary ligation of the external carotid artery. In the first case a complete ophthalmoplegia of the affected side was observed after the operation, but which disappeared in a few days with the exception of a paralysis of the abducens. Corneal ulceration did not appear. In the second case, immediately after the operation, there appeared a paralysis of the abducens, lagophthalmos, and later on corneal ulcerations.

Prat[4] has recently published a very creditable monograph upon resection of the Gasserian ganglion containing an historical sketch and the anatomical relations. The majority of the monograph is taken up with the operative technique. The work is based upon two cases coming under the author's observation, and contains a careful tabulation of all cases hitherto reported in literature.

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[1] Journal of the American Medical Association, September 24, 1904.

[2] Medical Chronicle, fourth series, vol. vi.

[3] Liecnicki viestnik, 1904, Nr. 2 u. 4

[4] Thèse de Paris, 1904.

OCCIPITAL OR RETROMASTOID ROUTE. In a review of the various surgical procedures for the removal of the Gasserian ganglion Armour[1] refers to a method of approaching the sensory root suggested by Ramonède, which the latter called the "occipital or retromastoid" route.

An incision, which includes the soft parts down to the periosteum, commences 1 cm. above the tip of the mastoid process and in the centre of its cutaneous surface, and passes upward just behind the commencement of the temporal ridge. Curving backward it reaches its highest point, 3 cm. above the superior curved line of the occiptal bone, and then passes downward, at a distance of about 4 cm. from the external occipital protuberance. A flap of periosteum is then turned down. The posterior border of the mastoid process and the asterion are thus laid bare. An opening in the skull is made, reaching upward 1 cm. above the asterion and in front nearly to the mastoid process. In the upper and the anterior part of the opening is seen the lateral sinus. A semicircular incision is made in the dura along the bend of the sinus and a short distance below it. The cerebellum is retracted and the root of the fifth nerve reached at the apex of the petrous bone, avoiding in so doing the seventh and eighth nerves lying below and at a lesser depth. The nerve is isolated by means of a blunt hook, care being taken to avoid wounding the sixth nerve lying beyond it. The sensory root is severed and the peripheral end torn away. This suggesiton is a perfectly feasible one, although in the majority of cases would be attended with greater difficulties and in inexperienced hands with greater danger than the operation in front of the petrous bone. The root of the fifth nerve passes from the cerebellum to the groove in the petrous bone near the cerebellopontile angle—a region in which the manipulations must be conducted in a very delicate manner in order to avoid inflicting an injury on the pons. In a case of a suspected cerebellar tumor upon which I was operating for Dr. C. K. Mills, the latter suggested that if the tumor could not be found I should cut the sensory root to relieve the patient of the intense neuralgia from which she was suffering. A cyst was found and evacuated, and the patient recovered and was relieved of her pain. At that operation I was able to demonstrate to the bystanders the fifth, seventh, and eighth nerves.

Intracranial Resection of the Superior Maxillary Division. Three years ago Hutchinson[2] advanced the proposal that the so-called excision of Meckel's ganglion (always a difficult and uncertain procedure, involving disfigurement of the face) should be given up for intracranial division of the superior maxillary trunk just above the foramen rotundum. The recommendation was based on the following considerations: "1. The more central the operation, the more certain is the prospect of permanent cure. 2. In almost every case of peripheral operation, including excision of Meckel's ganglion, the neuralgia has returned. 3. The surgeon who works through the walls of the antrum to the pterygomaxillary fossa is greatly hampered by the depth of the wound, as well as by hemorrhage from the internal maxillary artery. He may succeed in defining the superior maxillary nerve in the upper part of the fossa, but he is likely to fail. 4. A depressed scar in the middle of the cheek is much more disfiguring than one hidden by the scalp. In the middle fossa of the skull the whole of the superior maxillary trunk, before it gives off any branches, can be exposed, and a considerable portion of it (one-third to one-half inch) can be excised, so that there will be no chance of subsequent union." Hutchinson believes the intracranial route is at least as easy as the facial one, and without doubt it affords more certain access. It is to be preferred to the operations of Lücke, Billroth, or Kocher, which, as Treves has said, are "all needlessly severe and involve wounds of great and unnecessary magnitude." There is reason to believe, further, that the results of intracranial division will be more lasting than those of extracranial division. In five of Treves' cases the pain recurred in from twelve months to three years, and in but three of twenty cases of Kernochan's operation was relief permanent.

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[1] Practitioner, June, 1904.

[2] Lancet, April 16, 1904.

Extracranial Division of Second and Third Division. Broekaert[1] regards the extracranial operations as preferable to intracranial operations in the treatment of trigeminal neuralgia, and has tried to devise a method whereby the trunks of the second and third divisions may be approached at their exit from their respective foramina, and forcibly torn from the ganglion. The mode of procedure, which he elaborated upon the cadaver, is too complicated to describe, and I believe would be equally difficult to perform.

Classification of Trifacial Neuralgias by Cocaine Injection. The ability to determine whether the lesion is confined to the peripheral nerves or to the ganglion or to the central nervous system—that is, whether the pain is of peripheral, ganglionic, or central origin—has long been sought for by surgeons as a means of deciding whether, in a given case, the extracranial or the intracranial operation was indicated. Verger[2] classifies his cases, twenty-three in number, according to Petres' method by their behavior to injections of a 2 per cent. solution of cocaine. If the injection of cocaine into the painful place stops the neuralgia crisis for a time, the cause is probably in the periphery; if the injection does not modify the crisis, the cause is higher up in the roots or ganglion. The injection must be made between the paroxysms, so as to prevent their appearance, if any value is to be attached to its use. In ten of his cases the cocaine had no effect.

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[1] Bull. de l'Académie royale de médecine de Belgique, Brux., iv. serie, tome xviii., No. 1, January, 1904.

[2] Revue de médecine, January, February, 1904.

Lesions of the Accessory Sinuses of the Nose. Possible Etiological Factors in Tic Douloureux. At the last meeting of the Medical Society of the State of New York, Snow, of Syracuse, reported a series of cases of *tic douloureux* and other facial neuralgias which had been cured by treatment of the intranasal structures and of the accessory sinuses of the nose. In some of these cases serious operations had already been performed with only passing success. It does not seem likely that such degree of pressure as would be exerted upon the delicate nerve endings by collections of fluid in the sinuses would be sufficient to give rise to the paroxysmal pains of major tic. Infection of the sinuses may, of course, be the exciting cause of an ascending peripheral neuritis, which would lead eventually to a true *tic douloureux*.

Division of the Auditory Nerve for Tinnitus Aurium. Several years ago Krause demonstrated the feasibility of dividing the eighth nerve in the cerebellar fossa, and recommended this treatment in obstinate cases of tinnitus aurium. Recently Wallace[1] attempted this operation upon a patient who suffered from a very aggravated type of this condition. The operation had been practised several times on the cadaver before it was undertaken upon the patient. The complete operation for mastoid caries was first performed, exposing the lateral sinus and removing the posterior wall of the meatus down to the level of the facial canal. That portion of the temporal bone, forming the wall of the mastoid, was next removed, starting from the groove for the lateral sinus and extending forward and upward as far as the horizontal semicircular canal to the remains of the posterior wall of the meatus. The extent of dura mater in front of the lateral sinus exposed by this means was about three-eighths of an inch. The anterior edge of the exposed part of the dura was then incised to about the extent of one inch; the lateral sinus gave considerable trouble. It was much distended and protruded in such a way as to suggest that the normal flow through it was obstructed. In removing the bone at the lower part of the wound bleeding occurred, which necessitated plugging and the suspension of the operation. The second stage of the operation was undertaken after an interval of one week. The anterior border of the exposed part of the dura mater was divided for a distance of about one inch. A retractor was introduced, but it was found that there was not sufficient room to expose the nerve owing to the resistance offered by the lateral sinus. This was, therefore, divided between ligatures. The cerebellum was next slowly pressed backward, but the continued flow of cerebrospinal fluid somewhat interfered with a good view of the parts. The auditory nerve was then picked up on a hook and divided. The patient enjoyed very little if any relief from the operation, lingered on, and died twenty-one days later. At the autopsy it was found that the auditory nerve had been divided with the exception of the strand as thick as a fine piece of cotton, which lay next to the facial nerve. The latter was intact. The cause of death was undetermined. The operator seems to have been annoyed to a considerable extent by hemorrhage from the surface of the cerebellum, and attributes his failure to divide the nerve completely to this complication. In my experience in cerebellar surgery hemorrhage from this source has never been troublesome. There is no mention made in the article of the suggestions of Krause and to the fact that he was the first to prove that the operation was feasible.

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[1] Lancet, April 30, 1904.

Facial Nerve. THE TREATMENT OF FACIAL PALSY BY NEURAL ANASTOMOSIS. But little has been added to our knowledge of this important contribution to the facial nerve during the past year. In the March, 1904, number of PROGRESSIVE MEDICINE the subject was discussed very fully. But few additional cases have been reported, and in many cases the reports were published too soon after the operation to disclose the final results. Taylor and Clark[1] have put on record three cases in which the stump of the facial nerve was implanted into that of the hypoglossal. Of these, one was reported ten weeks after the operation, at which time the face was far less asymmetrical and the eye could be partly closed. There was no control of the muscles of the face. Six weeks after the operation on the second case it is said that the electric reactions show beginning regeneration of the nerve; but one month had elapsed since the operation on the third case, and no improvement could at that time be expected. Discussing the question as to whether the hypoglossal nerve should be divided transversely or a lateral anastomosis practised without division of the nerve, the authors say: "While the end-to-end suture gives the most active and complete regeneration, yet we felt scarcely justified in causing a permanent division of the hypoglossal. The difficulties of mastication, deglutition, and phonation present for the first few weeks in our three cases were of sufficiently marked degree to cause us to feel that the complete and permanent paralysis following transverse division of the nerve would be a serious drawback to the comfort and happiness of the patient. Case II. could swallow only liquid food for three weeks after the operation. In Case I. the boy's voice for several weeks sounded like that of a cleft palate, and many of the guttural words could scarcely be enunciated. Only three cases besides those in this paper are recorded, and they are all of such recent date that the ultimate results are still problematical. A larger number of cases and a sufficient lapse of time, so that final results can be compared, will give us a reasonable basis for determining whether the patient is better off with a more complete return of power in the facial supply with permanent paralysis of the hypoglossal or whether, on the whole, he is better off with a somewhat less complete control of the facial and only a temporary disturbance of the hypoglossal. It seemed to us, meanwhile, the part of conservative surgery to approach the subject from the standpoint of doing as little additional damage to the patient as possible until we could see what was to be the result." Though my experience with this operation has been limited, I have never seen any difficulty in swallowing or phonation following division of the hypoglossal nerve when the latter has been divided for anastomosis with the facial nerve, or when it has been necessary to remove the nerve in extirpation of malignant growths. The advantages of this procedure, to my mind, outweighs the disadvantages. End-to-end suture is a simple operation; the re-education of the cortical centre is easier if it has only the new group of muscles to work on, and end-to-end suture causes more active regeneration.

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[1] Medical Record, February 27, 1904

In twenty-two attempts to restore the function of the nerve by anastomosis in cases of facial paralysis, according to Munch, seven failed. Among the successful cases the results of Kennedy and Körte were the most gratifying. In a man, aged thirty years, who was suffering from facial paralysis as a result of chronic middle-ear disease, Mintz[1] effected an anastomosis between the facial and spinal accessory nerve. The method adopted was an end-to-end suture. The central portion of a branch of the spinal accessory was sutured to the peripheral stump of the facial. In order to facilitate the operative procedures the author divided the posterior belly of the digastric muscle. Two months after the operation the patient could close the lids completely, and in the further course of events the motor function of the entire left side of the face was restored. Some of the movements were associated, as, for example, when the patient closed his left eye, the entire musculature of the face, including the platysma, was brought into play; the sternocleidomastoid muscle did not contract. It appeared that a disassociation in the centre for the spinal accessory nerve had already made itself evident.

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[1] Zentralblatt für Chirurgie, 1904, No. 22.

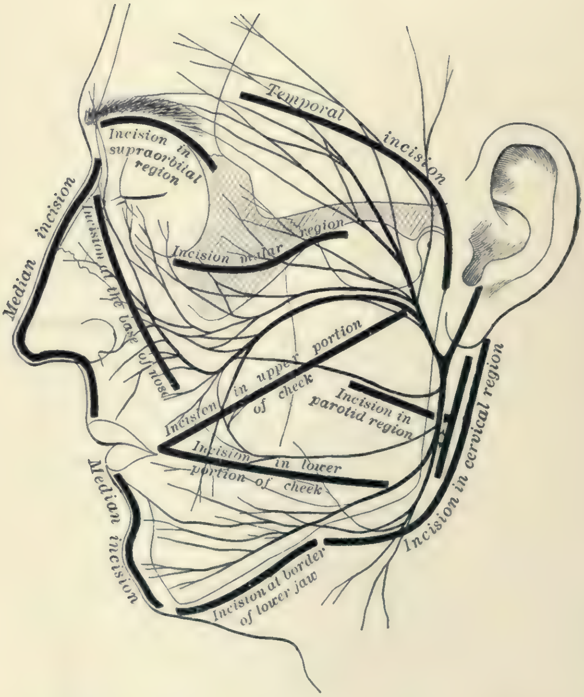
Temporal incision
Incision in supraorbital region
Median incision
Incision at the base of nose
Incision malar region
Incision in upper portion of cheek
Incision in parotid region
Incision in lower portion of cheek
Median incision
Incision at border of lower jaw
Incision in cervical region

Illustration showing the incisions which should be made in various regions of the face in order to avoid important branches of the facial nerve.

Suture of Facial Nerve. Five months after an operation for removal of tuberculous glands of the neck, in which the nerve had been severed, Bristow[1] had intended to anastomose the facial to the hypoglossal nerve. He was fortunate, however, in being able to find the divided ends of the facial quite readily in the cicatricial tissue. With an electrode he was able to determine that, beyond a nodule of cicatricial tissue in the course of the nerve, electric stimulation gave a prompt reaction in the muscles. Accordingly he cut out the scar segment and sutured the two ends together. Two weeks after the operation he reports some slight evidence of regeneration. Renton[2] operated on a child who had had facial paralysis for three years, following mastoid disease. The mastoid and tympanic cavities were converted into one, according to the method recommended by Macewen and Ballance, and all the unhealthy tissue was removed. The cavity having filled in with granulation tissue by the end of a week, skin grafts were applied to close the defects. The patient was discharged, with instructions to return in a month with a view toward suturing the facial to the spinal accessory, but when she returned the paralysis had completely disappeared. The case illustrates the value of the operation recommended by Macewen and Ballance, and is also interesting as showing how promptly the muscles recover their function after having been paralyzed for three years.

Anatomy of Facial Nerve. The course and distribution of the facial nerve and its branches have been carefully worked out by Bockenheimer,[3] with especial reference to the incisions which may be required for various operative procedures in this region. The article is accompanied by diagrams (one of which is herewith shown) illustrating the advantages and disadvantages of the incisions which have been recommended from time to time by various operators, and to these is added such incisions which the author regards as superior in that they avoid the important branches of the facial nerve. The article is too long to be reviewed in detail, but it is worthy of study for those who are called upon any time to perform operations in the region covered by the distribution of the facial nerve.

Hydrocephalus. The operative treatment of hydrocephalus consists in drainage of the lateral ventricle. To be successful Taylor[4] says a method of drainage must be internal, slow, prolonged, or permanent. A small permanent fistula between the lateral ventricles and the subdural space would most closely resemble normal conditions. To meet these indications Taylor exposes the second temporosphenoidal lobe by an osteoplastic flap, and through this lobe he introduces a drain composed of six strands of forty-day chromic catgut bound together by a loose spiral of catgut and enveloped by three layers of Cargile membrane. The second temporosphenoidal convolution was chosen because through this the body of the ventricle may be drained, and because the drainage canal is in close proximity to the great lymph spaces and venous sinuses at the base of the brain. This point is to be referred to the dome of the brain or to the under surface of the occipital lobe. In the latter instance the brain tissue requires too much handling, and in the former the layer of brain tissue is so thin that the drainage material is retained in place with difficulty. Six cases were operated upon by Taylor along these lines, with the following results: Case I. is alive twenty months after the operation, with considerable mental but no physical improvement. Case II. was alive eleven months after the operation, and improved both mentally and physically. Case III. lived two months, and died of acute gastrointestinal disturbance. Case IV. died about sixty hours after operation, and unquestionably as the result of it. Case V. had apparently reacted from the operation by the fourth day, then developed otitis media, which drained satisfactorily; then, finally, anuria and death on the eighth day. Death probably would not have occurred at that time had no operation been performed. Case VI. died suddenly on the sixth day, when he had apparently been slowly recovering from the sharp reaction of the first three days. The wound was infected, but apparently not in the deeper tissues.

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[1] Brooklyn Medical Journal, June, 1904.

[2] Bristol Medical Journal, January 16, 1904.

[3] Archiv für klin. Chir., Bd. lxxii., Heft 3.

[4] American Journal of the Medical Sciences, June, 1904.

After reviewing the various surgical methods of treating hydrocephalus, Ricketts draws the following conclusions: Excessive secretion of the cerebral meninges may occur in any form of animal life. The various forms of vegetable life are subject to excessive local or general secretion to a fatal degree. Hydrocephalus, ventricular or meningeal, may develop *in utero* or at any time throughout infant or adult life. The number of cases of spontaneous recovery in either are probably numerous, especially in infant life, where the arachnoid is alone involved. All cavities may unite with or without external rupture. When so, it is usually fatal. Spontaneous rupture may occur externally or subcutaneously, with an occasional recovery. The effusion may be into the lateral third or fifth ventricle, or it may be in the arachnoid cavity, one or all. A clot in the arachnoid cavity may cause a cyst, which will enlarge with all its consequences. Syphilis and rickets have been assigned as causes of hydrocephalus, but such have never been proven; cause yet unknown. Sometimes zones of new osseous material are seen scattered here and there in the meninges, and sometimes upon or in the brain substance. The septum lucidum is invariably thickened, as are the cerebral meninges in general. It is probably the greater number of cases of hydrocephalus, whether of the third or fifth ventricle, or of the arachnoid variety, that can be cured by some form of drainage. Continuous drainage by seton or the repeated use of the trocar has given better results in the way of benefit or cure. Spinal drainage has been practised to but a very limited degree, and as yet very undetermined. Subcutaneous drainage has not as yet resulted in a cure, but there seem to be many possibilities for this method. Trephining for drainage is only resorted to in cases where the fontanelles have been closed by bony union. Results from drainage are more favorable if it is done when the presence of fluid is first detected. It is sometimes necessary to drain both hemispheres together with the right and left cerebellar cavity. The secret of curing arachnoid hydrocephalus by drainage probably lies in obliterating the arachnoid cavity. However, this can hardly be so with hydrocephalus of the third, fourth, and fifth ventricular variety. The cardinal principle in this as in all operations upon the brain is asepsis.

Morton[1] adds another to the long list of fatalities following operation for the treatment of hydrocephalus. The mortality is said to be so near to 100 per cent. that no one surgical method has ever yet become an established procedure. The operation which Morton performed consisted in drainage of the ventricles into the subdural spaces. The operation was performed on both sides at an interval of about a month. The child died ten days after the second operation, with a temperature of 105°. An autopsy was performed, and the connection between the ventricles and subdural space was found to be uninterrupted on both sides, but, despite the fact that a communication existed between the ventricle and subdural spaces for some time, the hydrocephalus increased.

Lumbar puncture is efficacious in the treatment of hydrocephalus according to Löwenburg[2] only before ossification has taken place in the sutures or fontanelles—*i. e.*, before the second year—and only when there is a free communication between the ventricles and the subdural spinal space. Löwenburg, in the case of a child aged twenty months, withdrew by lumbar puncture 50 to 60 c.c. of cerebrospinal fluid once a week for a period of two months, when the child died of pneumonia following measles. The child's condition had improved both mentally and physically.

Epilepsy. At the last meeting of the National Association for the Study of Epilepsy and the Care and Treatment of Epileptics, two papers were presented bearing on the surgical treatment. Da Costa,[3] after calling surgeons to task for their lack of conscience and discrimination in their attitude toward epileptic subjects, suggests the following modifications of

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[1] British Journal of Children's Diseases, vol. i., No. 9.

[2] American Medicine, August 6, 1904.

[3] Medicine, February, 1904.

Sir Victor Horsley's classification as a common ground upon which the operative treatment may proceed: 1. Reflex epilepsy, the surgical treatment of which I shall not discuss. 2. The common, non-traumatic, idiopathic, or essential epilepsy, in which the attacks are general and are without a local onset. 3. Idiopathic epilepsy, with a local onset of attacks (focal or Jacksonian epilepsy). 4. Traumatic epilepsy. This may be subdivided into two forms: (*a*) attacks without a local onset, and (*b*) attacks with a local onset (focal or Jacksonian epilepsy). 5. Jacksonian epilepsy, due to gross brain disease (tumor, aneurysm, etc.). 6. Epilepsy following infantile cerebral palsy. 7. The posthemiplegic epilepsy of adults.

As to the treatment of *idiopathic epilepsy*, the uncomplicated cases should not be operated upon. If the epileptics suffer from persistent headache, a button of bone may be removed to relieve pressure; or in the status epilepticus, trephining with drainage of the lateral ventricle is justifiable. Kocher, believing operation is essential in epilepsy, on the ground that the condition is due to increased intracranial pressure. trephines the skull, cuts away corners of the dural flap to prevent reformation of bone, and drains the lateral ventricles with a silver tube. The objections to this operation are threefold: (1) the dangers of infection, (2) of hernia cerebri, (3) the fact that pressure is a result, not a cause, Jaboulay recommended excision of the sympathetic in essential epilepsy on the theory that the brain is anæmic and removal of the vasoconstrictor influence will produce a hyperæmia. This theory has practically been abandoned by neurologists, and the advocates of Jaboulay's operation now employ it upon the hypothesis that it produces a trivial hyperæmia and improves the nutrition of cells. In commenting upon this method Da Costa says the surgeon assumes an imaginary cause for the disease and combats this with a theoretical operation.

Idiopathic Epilepsy with Focal Symptoms. Most of these are due to cerebral infantile palsy, and if the case is seen within two years of the onset of the attacks, and from the very start the attacks had a local beginning, it is proper to trephine and excise the motor cortical centre. In adults, if the attacks are so frequent as to produce exhaustion and threaten life, here, too, the centre should be excised. This operation cures probably not more than 1 or 2 per cent. The prognosis would be better if one could prevent the formation of adhesions between brain and meninges, and for this purpose absorbable materials, such as the inner lining of an egg-shell or Cargile's membrane, rather than nonabsorbable materials, such as gold or silver foil, should be used.

Traumatic Epilepsy. It may be laid down as a rule that when there has been an identified traumatism one is justified in operating at any time even after years, and that when traumatism has not left such definite evidences one is justified in operating at any time before the third year after the occurrence of the injury. Traumatic Jacksonian epilepsy gives a better prognosis than does any other form; the more time that has elapsed between the injury and the operation, the worse the prognosis. The prognosis is better when the attacks are not general, and better, also, when the injury occurs in the motor rather than the sensory area. When following an injury in the frontal region operation affords very little hope of success. Da Costa's views as to the surgical treatment of epilepsy are in accord with those of Jacobson, who says: "But while it is authoritatively proved that the value of trephining for traumatic epilepsy has been greatly exaggerated, owing to many operations having been ill-advised, and also, what is less excusable, to the premature reporting of successes, it by no means follows that this operation is to be abandoned; it is to be employed on more careful and more scientific lines. We should be careful in promising success, save in cases of recent injury, where there has not been time for the changes to occur, which, as we have seen, must render the occurrence of the convulsions after a time a matter almost of certainty. In other cases it will be only honest not to hold out much hope of cure, but to explain to the patients and his friends that the operation is more or less of an experiment; that its dangers are slight in experienced hands; that while cure, in the truthful sense of the word, is unlikely, some relief will almost certainly be granted in the number and severity of the fits; that in any headache, etc., from which the patient suffers it is impossible to state what the amount of relief will be until the parts have been explored; and, having said this, we shall be wise if we leave the decision in the hands of the patient or his friends. For as we know nothing of the actual causation of epilepsy in these cases, so we must rest uncertain as to the relief which a trephine opening on wide lines may give. If headache or optic neuritis is present it will be removed. As to convulsions, we may hope that in cases that are not of too long standing the relief to tension may help toward recovery the impaired vitality of cells so delicately constituted as those of the brain. In other cases the opening may allow of the intracranial circulation undergoing the fluctuations to which it is inevitably exposed without the unstable cortex centres becoming congested and irritated and prone to explosions, as would otherwise be the case."

Munro's[1] paper, the second of these contributions, contains the clinical records and the lesions found at the operations upon eleven cases. They are reported with the hope that, by the accumulation of data, someone in the future may be able to determine with greater accuracy which patients are likely to benefit by surgical interference. It is interesting to note that in practically every one of these cases there was some pathological lesion or abnormality found at operation, but only vaguely suspected beforehand. The cases were not under observation long enough to tabulate them on the score of benefit or cure, and the lesions were so variable that they could not be compared one with another. Several were either not helped or were worse after operation.

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[1] Boston Medical and Surgical Journal, February 4, 1904.

Some patients were doubtless temporarily benefited, but whether *post hoc propter hoc* is extremely doubtful. As Munro says, if we can see enough of cases of living pathology and eventually can group them according to the results, the duration of preoperative attacks, etc., and then compare them with the results in similar cases under constitutional treatment, we shall be better able to advocate surgical interference or medical treatment, as the case may be.

From a study of a series of 300 cases of operations for the relief of traumatic Jacksonian epilepsy, Delbet (Paris) draws the following conclusions: Operation should be performed as soon as possible after diagnosis is sure and that the symptoms do not result from any peculiarity or hysterotraumatism. Trephining is indicated even in very old and extremely serious cases. If there exists on the cranium evidence of a depressed fracture, an exploration should be made at that point and the thickened or depressed bone elevated. Elevation of the dura mater is not indispensable, but it is wiser to reflect this membrane and examine the condition of the brain. In cases where there is no depression a large osteoplastic flap should be reflected. The large flap permits of an examination of a wide area of the meninges and brain, and is of the greatest assistance in which there is uncertainty as to the seat of the lesion. Areas of meningoencephalitis should be resected, but the brain should not be touched or disturbed unless manifestly affected. The brain should be explored when no explanation of the condition is to be found on the surface. Operations are almost always successful when a superficial lesion or an inflammatory cerebral lesion is found. This is not the case when the lesions are degenerative in character. Second and even third trephinings have been successful when the first had failed.

A contribution to the surgery of the brain by Nast-Kolb[1] contains a record of three operations for patients with epileptic seizures and some interesting comments thereon. In all the cases there had been a history of trauma, and in all the convulsions were at first limited to one region of the body. The first case terminated fatally six weeks after the operation, as a result of a hernia cerebri and suppurative meningitis. After removing an osteoplastic flap and making a cross-shaped incision into the dura, a number of small cysts were found. They were as far as possible extirpated and the region tamponed. The brain had already shown a great inclination to prolapse, so that it was not possible to close either the dura or the osteoplastic flap.

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[1] Deutsche Zeitschrift für Chirurgie, Bd. lxxv., Heft 5–6.

In the second case the cortical centre for turning the head was isolated with a faradic current and excised. The section excised was 6 x 9 x 11 mm. The paralysis disappeared in a very short time after the operation, but in six months the convulsions recurred, and at a second operation an outgrowth from the bone was found, which might have been responsible for the recurrent attacks. This was removed, and the patient remained free from convulsions for seven months. In the third case the convulsions proved to be due to a tumor of the brain, a fibroma, which, however, was not recognized until the second operation.

It is often impossible to determine whether the point of injury corresponds exactly to the region of the brain affected. In two of the cases paralysis was observed. As to the operative technique, Krönlein's method of localizing the central fissure was employed, the flap having been outlined with nitrate of silver after the scalp had been shaved the day before operation. The bony flap, measuring about 4 x 6 cm., was cut out with a chisel, and, as Kocher recommends, a crucial incision was made in the dura. The principal cause of epilepsy, according to Kocher, is the increase in intracranial pressure. The authors' cases only serve to establish their theory. On the principle that improvement would follow the removal of pressure, in two cases a greater part of the bony flap was removed. Kocher has found in following up his cases that in those which have recovered the defect in the bone had not been repaired, while in those that had not remained free from recurrence the bony opening had entirely or in large part ossified, or was closed by strong cicatricial tissue. As to the method of localizing the cortical centre, failures have been reported by those who have used a bipolar electrode, but if a single electrode is used the results will be satisfactory. Whether or not the excised centre was situated in the precentral convolution, where, according to the investigations of Sherrington and Grünbaum, the motor centres are situated, the author was unable to determine. There need be no fear that excision of the centres will cause a permanent paralysis; sooner or later function will for the most part be restored. In the author's case it returned exceptionally quick. Within twenty-four hours almost all the paralysis had disappeared. The author has collected from the literature some 84 cases. Of these, 29 per cent. have remained well for a year. Those which have been observed for less than a year, but at this time are free from attacks, number 20, and as improved there were 6; 5 died, and 28 were unimproved. Of traumatic Jacksonian epilepsy there were 35 cases; of these, 40 per cent. recovered. Of the non-traumatic cases of Jacksonian epilepsy there were 35 cases, of which 22 per cent. recovered.

The Horsley method of excising the cortical centre was practised in 14 cases, with 5, or 35 per cent., recoveries. The cases of recovery were observed from three to twelve years. In 11 instances was the centre localized by electric stimulation. The author is of the opinion that traumatic cases of Jacksonian epilepsy are those best suited for operative intervention, and the recommendation of the value of the Horsley method of treatment should be postponed until further observations have been made.

Œdematous Encephalitis in Epileptics. Carr[1] calls attention to certain conditions of the brain which he found in operating for cranial epilepsy and allied affections. The principal lesion was an œdematous encephalitis, the gross and microscopic appearances of which, as they were seen in his cases, being described in some detail. This condition will be found, he believes, in a considerable number of epileptics, at least in the earlier stages of the disease, and when found should be treated by introducing a grooved director into the brain substance in several places, draining the serum off until the brain assumes a normal appearance. A small drainage tube is introduced beneath the dura and left in place as long as there is a copious discharge of serum. Carr frankly states that it is impossible to say whether his cases were benefited by the operation or not, but it is reasonable to assume that the draining away of a large quantity of serum, by relieving pressure and perhap scarrying off toxic substances, may be responsible for the relief which follows. In each of his cases the improvement was marked and immediate, though in one it was only temporary. I take this opportunity to call to the attention of surgeons the importance of making careful observations of the gross conditions which are seen in operations upon the brain. Surgeons, as a rule, are wont to pay too much attention to the technique of the operation and too little if any to the lesions that present themselves at the operation. At all events, the reports of operative procedures contain in the majority of cases altogether too brief descriptions of the appearance of the tissues in the field of operation. The articles by Munro and Carr are marked exceptions to the rule in this respect. In cases of epilepsy, concerning the pathology of which there is so much speculation, it is of the utmost importance that no opportunity should be lost to contribute to our knowledge by examining with the utmost care and recording in every detail the conditions found at operation.

Excision of the Cervical Sympathetic for the relief of epilepsy has not many advocates. As Da Costa has well said, "the surgeon assumes an imaginary cause for the disease and combats this with a theoretical operation." Still, from time to time we see reports of the results of such operations as in the article by Hopkins,[1] who presents a preliminary report of five cases. In one there was a period of relief covering two years; in another six months; in a third there were three attacks in two years; in a fourth there was some amelioration for one year, and in the fifth the patient has been free from attacks for one year. No reports of the results of operations for epilepsy should be reported until at least three years have elapsed. The statistician must disregard preliminary reports if his tables are to be of any value. As a striking example of the tendency of how misleading statistics may be, a case of Engelhardt's[2] may be cited in which the patient was reported as cured five years after the operation. After an interval of rare seizures for three years and nearly two years of complete freedom from them, the attacks recurred, and in less than two years the patient was driven to suicide by their severity and frequency.

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[1] International Journal of Surgery, June, 1904.

TECHNIQUE OF CEREBRAL OPERATIONS.

Prevention of Adhesions. Those who have had opportunities to explore the field of a previous operation have seen the adhesions which have formed between the dura and brain as a result of the traumatism inflicted by the operative manipulations. The harmful influence of these in the production of postoperative epilepsy is such that one hesitates and sometimes even feels like refraining from advising operative intervention in cases of epilepsy, which are believed to be due to post-traumatic adhesions. Every surgeon has performed an exploratory craniotomy in Jacksonian epilepsy only to find a very limited area of adhesion between dura and brain, and has hoped that with the separation of these adhesions the exciting cause of the epileptic seizures would be removed. But in the course of a few weeks the convulsions returned with their former or often with increased vigor and frequency. A second operation is performed, and the last state is found to be worse than the first. Surgeons have striven by experimentation upon the lower animals and in their clinical work to find some means of preventing the formation of adhesions after operations upon serous membranes, whether it be dura or the peritoneum. Harris[3] discusses the various measures which have been adopted with this end in view. Chipault and Keen have removed the dura entirely; Beach, Estes, Weir, and others have introduced gold-foil; Abbe has tried rubber tissue, and Freeman has recommended the use of the lining membrane of an egg in place of inorganic substances. Whether the material should be an organic or inorganic substance has not yet been determined. There have been cases where such varied substances as rubber, silver, and gold-foil have remained *in situ* for a number of months with apparently beneficial results. Harris believes the thin foils are the best, and of these prefers silver. It is thin, soft, and smooth; conforms to all the irregularities of the surface on which it is laid. It is not only tolerated very kindly by the tissues, but exerts a beneficial influence on granulating surfaces. The foil may be placed directly in contact with the brain tissue, between the pia and dura, or wherever it may be necessary to accomplish the purpose desired. Harris reports a case in which silver-foil was introduced and the patient remained free from convulsions up to the present time—a year and ten months since the operation. It is important, he says, not only to control hemorrhage thoroughly and thus to prevent the formation and organization of clots, but to spread the foil some distance beyond the area involved in adhesions. From my experience in these matters I am disposed to believe that a non-absorbable material will not meet the indications. It stands to reason that a foreign body, no matter what the material, will be a source of irritation, and will excite the formation of granulation tissue, which will envelop the foreign matter and eventually become organized. Thus, a more or less extensive area of dura adhesions will be formed around the foreign body. I have found it necessary to reopen the wound and remove pieces of silver-foil which had been inserted to prevent adhesions because the epileptic seizures recurred soon after the primary operation with greater frequency and violence. In one case I found many new adhesions and considerable thickening of the dura mater, which could be attributed only to the presence of a constant source of irritation. I, therefore, prefer to use a material such as Cargile's membrane, which, after a reasonable time, will be absorbed.

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[1] New York Medical Journal, March 5, 1904.

[2] Deutsche med. Wochenschrift, Bd. xxx., No. 3.

[3] Journal of the American Medical Association, March 19, 1904.

Trephining under Local Anæsthesia. Heidenhain[1] found it feasible to perform a number of operations upon the head under local anæsthesia. He uses a ½ per cent. cocaine solution, to which is added one or two drops of a $\frac{1}{10}$ per cent. solution of adrenalin. If the solution is injected beneath the scalp, down to the skull, in the course of half an hour not only the scalp but the underlying bone and it seems the dura, too, will be completely anæsthetic. He believes that in the ½ per cent. solution 20 cg. of cocaine can be used for local anæsthesia without any danger of poisoning, providing certain precautions are observed. The patient should not come to the operation starved, and should during and after the operation maintain a horizontal position; during the operation he should be given coffee, with a few drops of alcohol, and after the operation a cup of thick soup. He should not be allowed to sit or stand sooner than one hour after the operation. Observing these rules, a ½ per cent. solution of cocaine can be used without apprehension of any untoward results.

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[1] Zentralblatt für Chirurgie, 1904, No. 9

Of greatest importance are his attempts to remove tumors of the brain under local anæsthesia. If the operation is to be done under local anæsthesia it must be divided into two stages: at the first stage the osteoplastic flap is reflected with the patient in the horizontal position. The second stage is carried out with the patient in the sitting posture—a posture which would not be admissible until the effects of the cocaine had worn off.

Method of Closing Defect After an Osteoplasty. In a case of depressed fracture of the parietal bone in which both the internal and external tables were splintered in a stellate fracture Kayser[1] describes what he considers a novel method of closing the resulting defect in the skull. The portions of the internal table which were removed are replaced at right angles to their former direction so that the ends of the fragments are firmly fixed in the diploë. The fragments of the internal table, in cases of fracture, are, the author says, especially suitable for closure of a defect in the skull, because they are large, because they can easily be fitted to the defect by simple rotation, and because by reason of their smooth under surface they are not apt to form adhesions with the brain or meninges. An especial advantage of the method is that it allows immediate closure, even when extensive destruction of the membranes or of the brain substance itself is present. Sufficient space is allowed beside the fragments for drainage. The author's case demonstrated clearly the value of the method, inasmuch as there occurred immediate "healing in" of the fragments and ultimately a perfect result.

Topography of the Skull. Bert and Vignard[2] has given Krönlein's *craniometer* a thorough trial at Lyons and believes it to be more exact than any of the other craniometric methods. In twenty-five trials on the cadaver the fissures were exactly located in fourteen, and in eight there was a slight variation from the exact location, but never to a greater distance than the diameter of the trephine. It is a simple, easy, and inexpensive method of determining the location of the various centres in the region of Rolando and Sylvius.

Hæmostasis in Craniotomies. In the performance of craniotomies or craniectomies, when the incision is a very long one, a very considerable quantity of blood may be lost unless certain preventive measures be adopted. The position of the patient is important; with the head and

[1] Deutsche Zeitschrift für Chirurgie, October, 1903.

[2] Revue de chirurgie, vol. xxiv., No. 4.

shoulders well elevated hemorrhage is decidedly less free. I have been in the habit of making the incision in sections of one or two inches at a time, stopping to check all bleeding from one section before proceeding. This is the simplest and at the same time a perfectly satisfactory plan. Cushing[1] had made some inflatable or pneumatic tourniquets, which could encircle the head or limb and take the place of the old elastic tourniquet. The possibility of paralysis, the amount of pain caused by pressure, the difficulty of properly estimating the necessary degree of compression, the awkwardness and difficulties of observing the best technique during the application, removal, and especially the reapplication. These are some of the disadvantages of the ordinary Esmarch tourniquet to overcome which Cushing recommends his inflatable appliances. These tourniquets may be used to advantage also in the extremities, where the constriction may be relieved partially or entirely by allowing the air to escape; if for any reason it is desirable to cut off the blood supply, the tourniquet may be reinflated.

Heidenhain[2] recommends the adoption of a plan whereby bleeding from the flap can be reduced to a minimum. Before the incision is made sutures are introduced on either side of the proposed line of incision in such a way that when drawn tight they constrict the bloodvessels in the scalp. These sutures are not removed at the end of the operation, but are allowed to remain until the sutures in the wound are removed. He has never found that necrosis of the tissues followed this procedure.

The prophylactic method of hæmostasis suggested by Heidenhain is further endorsed by Hacker.[3] The latter believes that it should be used in every case in which it is necessary to reflect a flap, except, perhaps, those in which the basis of the flap includes the main vessels. Under such circumstances none but the smaller branches would be cut. Von Hacker's one objection to this method is the possibility of stitch abscesses at the points at which the percutaneous ligatures are introduced.

THE JAWS.

Cystadenomata of the Jaws. Pincus[4] reports two cases of central cystadenomata of the jaw observed in von Bergmann's clinic, and, together with a review of the reported cases, outlines the clinical history of these tumors. They occur most frequently in middle age, from the twentieth to fortieth years, though cases have been reported at the extremes of life. In the previous history the patients frequently state that they have suffered from some disease of the teeth, an alveolar periostitis or carious teeth which have been extracted. In some cases periosteal cysts may develop from these inflammatory foci; in others the adenocystoma may be stimulated into development. Females are affected nearly twice as frequently as males, and Pincus could find but one case in the literature (Albarran's) in which the upper jaw was involved. The growth of the cyst is exceedingly slow, usually without pain, and increasing from within gradually thins the overlying shell of bone to such an extent that the familiar sign of "parchment-like crackling" is elicited. The skin overlying the growth is not involved and is freely movable over the bone. Fluctuation is commonly observed, and by giving proof of the cystic nature of the growth has led to the hope that aspiration of the fluid might furnish a method whereby the origin of the cyst could be determined. But unfortunately nothing characteristic has been noted in the contents of the cyst; it is of a yellow-brown or reddish color, containing cholesterin crystals and frequently a chalky deposit, giving the reaction for calcium carbonate. The lymph nodes, especially those in the submaxillary region, are occasionally enlarged, but only when ulceration of the cyst into the mouth cavity has occurred; the histological examination of such nodes show an inflammatory hyperplasia only. The diagnosis of these cysts must be made from carcinoma, sarcoma, odontoma, and dental cysts. Carcinoma originating in the epithelium about the jaw occurs much more frequently in the upper jaw, affects patients of a more advanced age, is painful, involves the regionary lymph glands, and is of more rapid growth. Sarcoma is particularly difficult to diagnose from the benign adenocystoma, particularly in the early stage of the myelogenous form. The age, the absence of glandular involvement, the occasional cystic nature of the mucoid or necrotic degeneration of the tumor cells resemble adenocystoma, but the growth is much more rapid, pain is present, and the tumor breaks through the bony shell in a short time. Odontomata are distinguished by the period of development. A cyst occurring after the complete development of the teeth is never an odontoma. Dental cysts resemble the adenocystoma in that both may contain a serous or serosanguinolent fluid, calcium fragments, or rudimentary teeth, and a fully developed tooth. The greater size which the adenocystoma attains, its extreme rarity in the upper jaw, and the microscopic examination of the cyst wall are the points of interest in the differential diagnosis. Histologically the cysts are believed to develop from rudiments of the enamel organ, to be epithelial in nature, and relatively benign. As incision and curettement of the cystic growth are frequently followed by recurrence, the tumor should be thoroughly removed by the hammer and chisel, even if it is necessary to partially resect the jaw.

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[1] Medical News, March 26, 1904.

[2] Zentralblatt für Chirurgie, 1904, No. 9.

[3] Ibid., No. 29.

[4] Archiv für klin. Chirurgie, Bd. lxxii., Heft 4, S. 995.

Dentigerous Cysts. As a rule but slight mention is made in the textbooks of dentigerous cysts because the diagnosis is comparatively easy, the treatment not difficult, and the condition itself not a serious one. There have been some very interesting contributions in literature from time to time, and these have dealt chiefly with the pathogenesis, as this is decidedly the most interesting phase of the subject, and the one which has excited the most discussion. Cumston,[1] in reviewing the subject, says that while Magital unquestionably did much to enlighten us, it is to Malassez that we are especially indebted, because he discovered that in the maxilla of embryos, in different stages of development, during the formation of the teeth there takes place, besides the physiological proliferation of the epithelium for the formation of the dental follicle from the embryonal enamel, other proliferative processes arising from both the organon adamantinæ and from the mucous membrane. These epithelial masses are in structure exactly like the enamel organ and persist in the lower jaw during adult life. It is from these masses that the so-called neogenous cysts of Magital as well as all tumors of the epithelial origin, such as the multilocular cystomata and cystadenomata, take their origin. Witzel's observations were interesting in this connection because he found these cysts in extracted teeth in the earliest stages of their development, long before they had reached the size at which they would attract the attention of the surgeon. They varied in size from the head of a pin to a pea; their walls were composed of an outer layer of connective tissue, an inner layer of epithelium, and between the two a layer of tissue abounding in bloodvessels and leukocytes. The histological structure of the larger cysts is very similar, save that the epithelial cells are flattened instead of being cubical. This variation is attributed to a tendency of epithelial cells to adapt themselves to the amount of pressure that is brought to bear on them. Cumston then alludes to three cases which he had seen. One about the size of a walnut, developed in the upper jaw just under the left nostril. The left nasolabial fold was completely obliterated and the nostril was pushed upward. Another was found in a boy, in the anterior aspect of the superior maxillary bone; it was of three years' duration and was as large as a small hen's egg. A third was that of a man, thirty-seven years of age, who for about eighteen months had noticed a tumor in the neighborhood of the wisdom tooth. They were all treated by incision, removal of the lining membrane, and drainage.

These cysts naturally grow in the direction of least resistance, and once the root is firmly lodged in the alveolar process by its periosteum the bone, being less resistant, gives way to the pressure. The absence of periosteum from the roots and apices of the teeth, which are sometimes found projecting into the cavity of the cyst, may be attributed to the effect of pressure exerted by the growing cyst upon the vessels and nerves supplying the tooth and periosteum of the root. As a class these cysts are known as periodontal or progenous (Magital) cysts in contradistinction to the periginous cysts which develop around a foreign body. The latter, acting as a source of irritation to the epithelial streaks of Brunn, cause an active proliferation of the epithelium, and this leads to cyst formation. It is easily conceivable that a tooth which did not make its exit from the jaw might well play the role of a foreign body and thus become the exciting cause. The retention of developed teeth does not necessarily lead to the formation of a cyst as in the case reported by Hildebrand, in which two hundred perfectly developed teeth were removed from the upper and lower jaws without any evidence of cystic formation.

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[1] Medical Record, May 7, 1904.

The diagnosis of dentigerous cysts when they have reached a certain size is attended with little difficulty. One finds a unilateral swelling of slow formation, gradually expanding the bone until it becomes so thin as to crackle on pressure or finally disappear by pressure atrophy. In some cases the cysts may rupture and evacuate their contents spontaneously. An exploratory puncture will give issue to a serous fluid unless the cyst has become infected from the buccal cavity or from the remains of decayed teeth. In the earliest stages it may be difficult to distinguish cysts from any circumscribed tumor of the jaw. Cystadenomata grow almost exclusively in the lower jaws. If a cyst should burst into the antrum a primary empyema of this cavity will arise, and vice versa. An infected cyst of the superior maxillary opening on the outside might easily simulate an empyema of the antrum if the cystic sac protrude into the cavity and completely fill it. Suppurating dentigerous cysts may resemble an alveolar abscess, but if the topography of the parts be remembered an erroneous diagnosis can hardly be made. The treatment is simple. Operation should be immediately undertaken and every vestige of the lining membrane should be removed. To accomplish this the cavity should be exposed by a large opening and the epithelial membrane removed with curette, scissors, or cautery. If any tooth or root is found protruding into the cavity, it should be removed. In the larger cysts of the lower jaw it may be necessary to reach the tumor through a cutaneous incision, but in most cases they may be reached through the buccal cavity.

Fractures of the Lower Jaw. A very efficacious and at the same time original method of securing fixation of the fragments in fractures of the lower jaw has been suggested by Mann.[1] It consists essentially in ligation of the teeth of the lower to those of the upper jaw, and is particularly adaptable to double fractures. At first the fractured ends of the jaw should be drawn together by a ligature of silk or cotton thread (not silver wire), by a figure of 8 turn passed around four teeth, two on either side of the fracture. If the line of fracture does not lie between teeth available for this purpose, this method will be impracticable. Teeth should now be selected for the special ligatures. At two convenient places two suitable teeth should be selected on the upper jaw which are fairly well apposed to two suitable teeth on the lower jaw. If the fracture is fairly well forward, one pair of teeth should be taken on one side of the fracture and one on the other side. If the fracture is farther back both pairs may be taken on the same side of the fracture. The ligature material may be carried backward between two of the teeth selected, well toward the jaw line, and often through some of the soft tissues, back around one of the teeth, in again between the teeth and back about the other one. This should be done so that the loose end between the teeth lies deeper than the main portion of the ligature, and so that the ends will tie above it, and pull it down when the ends are pulled down. This will serve to bind the suture tighter to the teeth when the ends are under tension. In a similar way a ligature should be tied about each two teeth selected. This will give two places with two loose ends above and two below. If there is no tendency to lateral displacement of the fractured jaw, the two ends above may be tied to the two ends below, separately or together, but so as to hold the lower jaw well up against the upper jaw. If there is a tendency toward lateral displacement, one may be left untied above and one end on the opposite side below. These ends may now be drawn together diagonally across the front of the teeth and tied so as to correct the displacement. The ends from right

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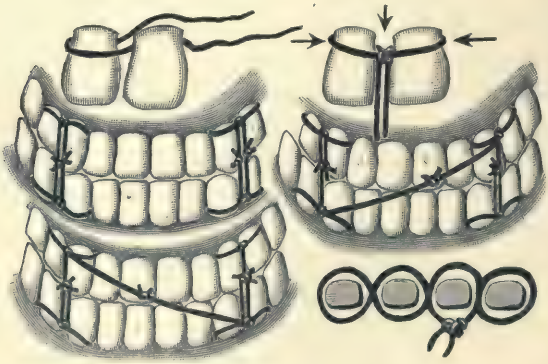
[1] Northwestern Lancet, vol. xxiv., No. 2.

FIG. 1.



Fracture of the lower jaw.

to left are used if the displacement is toward the left, and vice versa. The modified head bandage is now applied to remind the patient that he is not to jerk his mouth open against the ligatures. If the ligatures are placed with care they will usually stay in place for a long time. The above method of treatment is of peculiar advantage in some cases usually difficult to treat. In one fracture just back of the last molar it seemed impossible to gain fixation by the usual means, but tying the teeth of the lower jaw to the teeth of the upper jaw easily drew the jaw forward into place and held it there. The periosteum and the anterior attachment of the masseter muscle held the fragments together. In a similar way a fracture through the ramus with some angular deformity may be drawn into place and fixed; or a jaw swung over toward a fractured condyloid process may be drawn forward into place and held there. There is no difficulty about the feeding. A patient can take liquids, semisolids, soft-boiled eggs, and the like, by suction around behind the back teeth; and he can keep his mouth clean and comfortable by rinsing it with a suitable mouth wash.

Knapp[1] devised a rather ingenious method of making traction upward and forward to counteract the effect of the muscles attached to the hyoid bone. A strip of tin turned up at one end to form a gutter was secured to the head from the forehead to the occiput with a plaster-of-Paris bandage in such a way that the gutter projected beyond the bandage just above the eyes. Strips of adhesive plaster passed from the under surface of the chin to the gutter of the splint gave the desired traction upward and forward.

In cases of fractures in the front of the mandible, when the teeth are sound and steady, some surgeons use Hammond's splint. This consists of a stout wire which is bent to pass around the arch of the teeth inside and outside. There are certain objections to this splint, chief among which is the difficulty with which the wire is bent to its proper shape and the time consumed in making it. Crombie[2] suggests certain modifications of this dressing which he thinks obviates these difficulties. He makes a splint of stout, flattened wire of dental alloy fitted around the arch of the teeth in front and another similar wire fitted around the teeth behind. Collars of dental alloy plate are then fitted three-quarters around the back and sides of the second bicuspids or other suitable teeth on either side, and the ends of the wire soldered on to these collars with gold solder. The fracture having been reduced, the splint is placed in position and held in place by ligatures of binding wire passed between the nicks of the teeth at suitable points.

Sarcoma Treated by Radium. The patient had a large giant-celled sarcoma of the lower jaw, which surgically treated called for resection of

[1] Medical News, February 27, 1904.

[2] British Medical Journal, July 9, 1904.

the jaw, with hopeless mutilation and inevitable recurrence. Abbe[1] tried the effect of radium and found that not only was the development of the growth arrested, but that there was a marked shrinkage. The final report of the case has not been made.

Fibrosarcoma of the Antrum. Although the tumor was of two years' duration and had filled the entire cavity of the antrum, recovery ensued after its removal. Ingraldi,[2] who reports the case, says that the patient first complained of obstruction to the nose and had repeated copious hemorrhages. Some polypoid masses had already been removed from the nose before the condition had been recognized.

Actinomycosis. In the case reported by Harsha[3] the patient had a swelling of the size of a hen's egg at the angle of the jaw on the right side. The swelling, which was of four weeks' duration, increased in size, was quite hard at the edges, and seemed fluctuating. The tissue at the operation was found to be broken down and it presented the characteristic appearance of actinomycosis surrounded by a very dense, hard tissue. The mass was removed, but the wound did not heal until the Roentgen rays were applied. The characteristic ray fungus was found in the purulent discharge.

THE TONGUE.

Sarcoma of the Tongue. About three dozen cases of sarcoma of the tongue are on record. Keenan,[4] in an analysis of these, found that all belonged to the group of round-celled sarcomata, that they occurred not in early life, but in middle age, mostly between the ages of forty and fifty. Extensive metastases in the neighborhood were rather the exception than the rule, and local recurrence, though it may happen, is not common. Clinically they are to de distinguished from cancerous growths by the fact that the epithelium usually remains intact and only ulcerates after a long period. While a differential diagnosis between sarcoma and gumma may be difficult, with the aid of the microscope reliance may be placed upon the therapeutic test. In a case which came under Keenan's observation the growth was excised, but the patient died as a result of metastasis in the abdominal organs.

Lymphatic Invasion in Malignant Disease of Tongue. Lockwood[5] calls attention to the fact that the lymphatic glands in malignant disease of the tongue are not involved, as one would expect, according to their anatomical distribution. It is not always the glands nearest the lesion that are first involved, nor always the glands in the same side as that of the lesion. The lymphatic vessels at the tip of the frænum of the tongue empty into a gland under the mental process of the jaw, and this region should always be explored in operations for lingual epithelioma. Another gland which is frequently involved is situated on the hyoglossus, close to the edge of the mylohyoid. It is not always possible to feel the gland, even if enlarged, from the outside; one should examine by bimanual palpation, placing one finger inside the mouth and one outside in the submaxillary triangle. Attention is directed to a lymphatic arising from the tongue, which, passing down over the hyoid bone and thyroid cartilage, makes a loop and then enters a gland situated on the carotid artery, where it is covered by the omohyoid. The glands in the deep side of the submaxillary gland, the chain of glands along the carotid sheath from the base of the skull to the root of the neck, and the retropharyngeal glands, as well as the glands in the opposite side of the neck, should be included in the list of lymphatic glands, which are in direct communication with the lymphatics of the tongue.

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[1] Medical Record, June 4, 1904.

[2] Gazetta degli Ospedali cliniche, May 22, 1904.

[3] Annals of Surgery, March, 1904.

[4] Annals of Surgery, June, 1904.

[5] Clinical Journal, June 8, 1904.

Epithelioma in Women. There can be no doubt that epithelioma of the tongue in women is decidedly uncommon, but the frequency with which it occurs varies apparently according to the sources from which the cases are derived. According to different authorities the percentage of cases of epithelioma in women as compared with men varies from 3.4 per cent. to 43 per cent. Keyser[1] publishes the notes of 10 cases of patients who had come under his own observation either in the St. George Hospital or in the Cancer Hospital. In neither the appearance, situation, course, diagnosis, prognosis, nor treatment does the lesion in women appear to differ from that in men.

THE FACE.

Paraffin Prosthesis in Bilateral Facial Atrophy. Unless some means are adopted to correct the deformity the prognosis in progressive facial hemiatrophy, so called, is absolutely unfavorable. The atrophy progresses usually within a year or two of its beginning to a certain point, and then the process ends with no danger to life and often without discomfort. The condition is unaffected by massage, electricity, or dieting. The first attempt to correct the deformity was made by Luxemburger in 1901; he treated 2 cases by subcutaneous injection of vaselin. Since that time Eckstein, Gersuny, and others have used paraffin for the same purpose. Burley[2] records his experience in a single case in which the results were far beyond expectation. The atrophy followed an attack of pneumonia when the patient was eleven years old, and twelve years later the treatment was undertaken. In all, nine injections of from 1½ to 2 c.c. of paraffin with a melting point of 109.5° were given at an interval of a week. By this time the result was so satisfactory that no further treatment is likely to be necessary. In place of the atrophied subcutaneous tissue there is an inert, light, but firm substance. The natural movements of the face are surprisingly little impaired, and the patient had ceased to complain of the feeling of stiffness in her cheeks.

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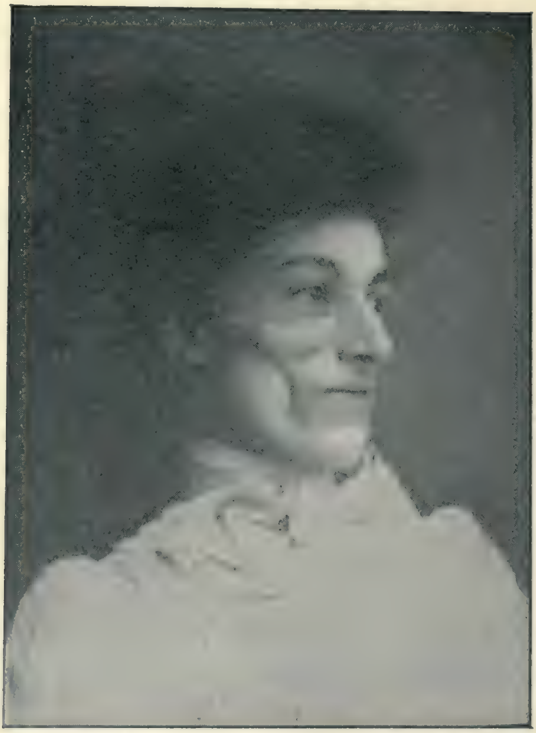
[1] Lancet, September 17, 1904

[2] Boston Medical and Surgical Journal, April 14, 1904.

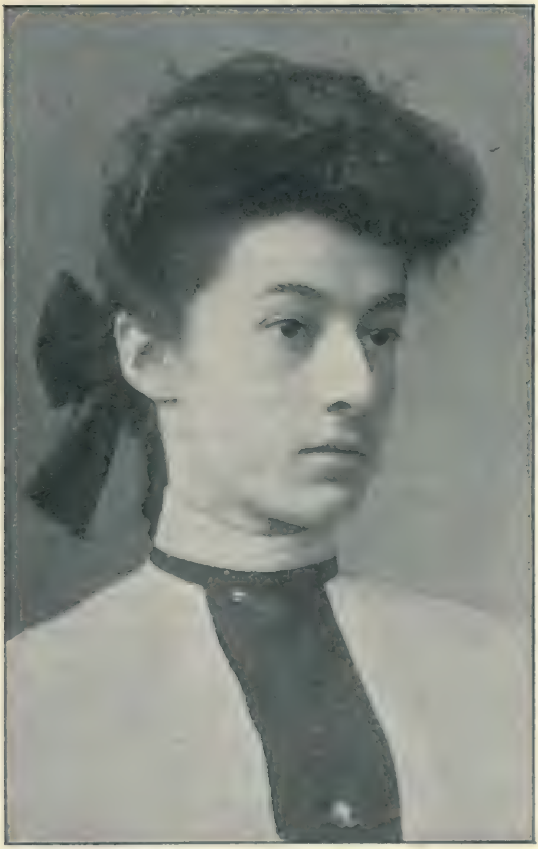
FIG. 2.



Facial atrophy before paraffin injection. (Burley's case.)

The Treatment of Nævi by the X-rays. The various methods hitherto employed in the treatment of nævus are not perfectly satisfactory from a cosmetic point of view. The so-called Wyeth method of injecting boiling water into the vascular spaces has yielded the best results in my own hands. If precautions are taken not to inject too much at one time the results are well-nigh perfect. The x-rays have been used in a number of instances, and in some cases with satisfactory results. But in order to cause obliteration of these telangiectatic lesions one must produce a dermatitis; the skin peels off, leaving a raw surface, which must heal by proliferation of epithelium from the edge of the defect. There is danger, of course, in producing an x-ray burn involving more than the superficial layers of the skin. In such cases the cicatrix resulting from the repair of the defect may of itself cause considerable disfigurement. Levack[1] treated 3 cases with seemingly good results. The resulting scar differed but little from normal skin, was generally of the same color, and quite as soft and pliable as its surroundings. The deeper tumors are naturally more difficult to eradicate than the superficial ones, but with care and persistence, he believes, even they can be made to ultimately yield and in most instances to disappear.

Fig. 3.



After the injection of paraffin.

Rodent Ulcer. In the application of the x-rays to rodent ulcers Fraser[2] thinks the results will be better by exposing the parts considerably longer in the first instance than the orthodox five minutes—perhaps five to six times as long. His practice now is to give an exposure in two consecutive days of, say, twenty minutes, then intermit for two days, and thereafter be guided by circumstances—particularly the reaction. This plan was adopted in a very extensive ulceration with most gratifying results.

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[1] Scottish Medical and Surgical Journal, July, 1904.

[2] Ibid., May, 1904.

Exostosis of Frontal Sinuses. The diagnosis of exostosis within the frontal sinuses may be attended with considerable difficulty, especially in the earlier stages, and may be at times even impossible, owing to the entire absence of objective signs. Severe frontal headache with a slowly increasing tumor appearing over the frontal bone or projecting from beneath the eyebrows are the earliest signs. Invasion of the orbit with displacement of the eyeball, disturbance of its motion, and double vision may send the patient to the ophthalmologist at first for treatment. Growth of the osteoma into the skull cavity may give rise to brain-pressure symptoms. Perthes[1] urges the use of the Roentgen ray as a valuable adjunct in the earlier recognition of these tumors. In a case reported the location and extent of the growth were accurately outlined and operation revealed the correctness of the findings, an osteoma weighing 25 grm. being removed. Perthes particularly urges the systematic enucleation of the encapsulated osteoma through a broad osteoplastic flap of the frontal bone in preference to the piecemeal chiselling through the roof of the orbit. Greater confidence in the more radical operation is gained by the knowledge confided by the use of the *x*-ray in accurately defining the tumor.

Nasopharyngeal Fibromata originating from the base of the skull extend into the pterygopalatine fossa and nasal cavities, and in a remarkably short space of time attain large proportions. Their removal requires an operation which becomes formidable through the efforts to expose the pedicle of the polyp and to gain sufficient room in which to work. Hertle[2] reports a case where the removal of a fibroma of the nasopharyngeal cavity was accomplished by the operation suggested by Kocher. In commenting upon the case Hertle remarks that the defect in the palate following the temporary separation of the severed superior maxilla on either side must be closed by a subsequent uranoplasty. As these tumors are frequently excessively vascular, the bleeding may be very profuse, not only depleting the patient, but interfering with respiration by filling the trachea. Firm pressure by gauze packing and the use of the actual cautery sufficed to control the hemorrhage in the case reported. Curiously enough Hertle condemns the expedient of temporary ligature of the external carotid, the risk of thrombus formation being considered too great to permit of its use. He finally suggests that the operation affords a means of ready access, not only to malignant growths of the nasopharyngeal space, but to tumors of the pituitary body.

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[1] Archiv für klin. Chirurgie, Bd. lxxii., Heft 4, S. 1022.

[2] Ibid., Bd. lxxiii., Heft 1, S. 75.

Rhinoplasty. Habs[1] has devised a rather novel plastic operation for the restoration of the nose. His technique differed from others, in that the flaps contained a strip of bone covered with normal periosteum. This was essential, since his patient had lost the entire nose, including its bony support. After having fashioned the skin flap on the ulnar side of the forearm and dissected it back, a similar-shaped flap of bone, together with the periosteum, was chiselled off the underlying ulna. This was reflected in such a way that the raw surface of the bone and that of the skin flap were brought into apposition and fixed there, while the segment of bone itself remained still in connection, through a broad bridge of periosteum, with the underlying bone. At the second sitting the periosteal ridge was covered with skin, so that the entire flap was now contained within a cutaneous envelope. Several months later, after freshening the nasal defect, the flap was sutured in place, while immobility of the arm was secured by a plaster-of-Paris bandage. After three weeks the base of the flap on the arm was divided. The cosmetic effects were all that could be desired. Equally good results may be obtained in a less complicated way by utilizing one of the patient's fingers. The author has resorted to this method with satisfactory results. An incision is made along the palmar aspect of the fingers and flaps reflected on either side. The raw surfaces are then covered with skin grafts, and, when healing is complete, the edges of the nasal defect are freshened and the edges of the finger flaps are united to them with fine silk or catgut sutures. The arm is secured in place with a plaster bandage and retained until a sufficiently free circulation has been established through the edges of the wound to provide for nutrition of the finger when it is cut off from its original blood supply. The finger is now amputated at the metacarpal-phalangeal joint, and the proximal phalanx flexed so that the tip of the nose is represented by the head of the proximal phalanx, and the base of the latter is sutured to the lip so as to form the column. The success of the operation will depend, of course, upon the establishment of a collateral circulation sufficient to ensure the preservation of the amputated finger.

Atresia of the Nasal Passages. Success can be obtained in plastic operations for the removal of nasal obstructions, no matter what their origin, only by covering in the raw surfaces of the incision with skin or mucous membrane. If this precaution is not taken, the opposing raw surfaces will grow together or the contraction attending their repair will exaggerate rather than improve the condition for which the operation was performed. The following diagrams illustrate Roe's[2] method of treating atresia of the upper and lower portions of the vestibule (Figs. 4 to 7).

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[1] Münchener med. Wochenschrift, 1904, No. 10.

[2] New York and Philadelphia Medical Journal, July 30, 1904.

The operation for the removal of synechiæ is performed in a similar manner by utilizing the mucous membrane of the band for covering the denuded surface on one side of the nostril, where the band has been cut away. Fig. 8 represents synechiæ between the middle turbinated bodies

FIG. 4.

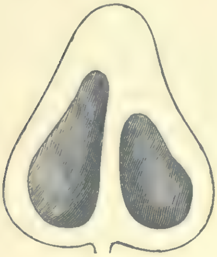

FIG. 5.

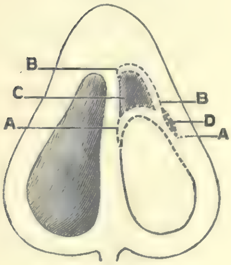

FIG. 6.

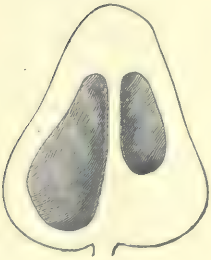

FIG. 7.

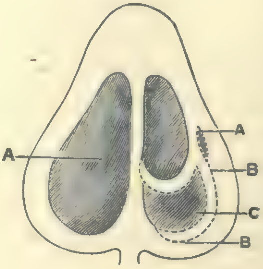

FIG. 8.

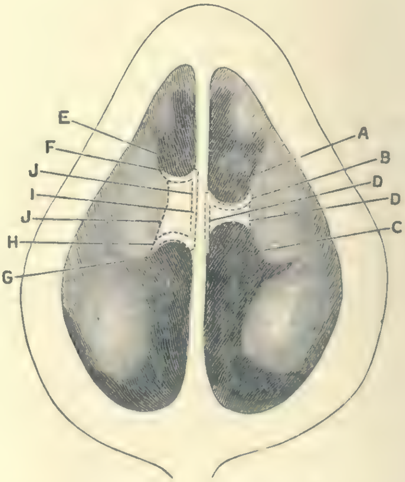

FIG. 4.—Contracted condition of upper portion of opening and vestibule in atresia of anterior nasal passage.

FIG. 5.—Line of incision for correcting this condition. A A. Method of making flap of skin for apex after removal of redundant tissue. B B. Incision for removal of redundant tissue; also shows flap turned up into apex of opening. C. Flap from portion of redundant skin turned back to cover denuded border.

FIG. 6.—Atresia occupying lower portion of vestibule.

FIG. 7.—Method of operation for correcting the condition shown in Fig. 6. A A. Incision for flap to fill in lower border after removal of redundant tissue. B B. Flap in place. C. Portion of skin turned inward to cover denuded wall.

FIG. 8.—Synechiæ between middle turbinated bodies and septum, showing method of making flaps to cover denuded surfaces on one side of the passages after the bands have been cut away.

and the septum and the method of making the flaps for covering the denuded surfaces on one side of the passages after the band has been cut away. On the right-hand side of the drawing is shown a condition in which but one flap only (preferably from the upper side of the band) is required for covering the denuded space on the septum. A B shows the line of incision for making the flap. A C shows the flap applied against the septum, where the band has been cut away at D D. On the left-hand side is represented a more extensive synechia, in which the flap from both the upper side, E F, and the lower side, G H, is required to cover the denuded surface on the septum. E G shows the two flaps placed against the septum and stitched together at I with fine horsehair sutures after the synechia has been cut away at J.

In those cases in which the band is very wide, it may be necessary to take flaps from both the upper and lower sides of the synechiæ in order to cover in the defect. Union of the flaps in all cases may be facilitated by lightly packing the nostril and by inserting a Simpson-Bernay intranasal tube. The sutures may readily be introduced by the small curved needles which Roe has devised for this and similar work. They have a double spiral curve, so as to permit the insertion of a suture at right angles to the shaft of the needle and in a very small space. When the synechiæ occupy the vault of the passage, the same plan of operation as suggested for restoring the skin to one side of the vault of the vestibule may be applied. In the removal of hypertrophied bodies and bones, a flap of mucous membrane sufficiently thick to preserve its vitality should be reflected. The obstruction is then removed, and the defect covered by the flap. In case of bony or cartilaginous spurs, the periosteum or perichondrium should be raised also. This method preserving the periosteum, as well as the mucous membrane, is of special service also in the operation for the so-called submucous resection of the septum.

Saddle Nose. The introduction of plates for the correction of this deformity frequently resulted in failure, and the method has been replaced almost entirely by paraffin injections. Wiener[1] was successful, however, with a celluloid plate in securing the desired result. He made a small incision in the median line in the under surface of the nose, and through this incision, with iridectomy scissors, he made a subcutaneous flap. A piece of celluloid of the proper dimensions was moulded into shape and introduced through the incision and pushed upward until it occupied the space corresponding to the subcutaneous flaps. There was a little swelling for a week or ten days, but the wound readily healed, and the flap preserved its vitality.

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[1] Medical Record, April 10, 1904.

THE NECK.

Torticollis. The etiology of torticollis is a question which has given rise to considerable discussion and speculation. The investigator is confronted with a number of questions, not the least of which is the fact that the development of the process is an intrauterine one, and, therefore, not capable of direct observation. Kempf[1] reviews, in a critical way, the opinions of those who have given this subject their especial attention, and as a result of his investigations he has come to the following conclusions as to its etiology: The histological findings in the sternocleidomastoid muscle cannot be offered in proof of the inflammatory nature of the affection. Rather are they in favor of the anæmic theory, both on account of the exposed position of the muscle and the peculiar distribution of its vessels. The sternocleidomastoid muscle offers conditions which may be said to be favorable to the development of an anæmia. The vascular supply of the muscle is derived from vessels which enter the muscle only in its upper third. Only in exceptional instances does the middle or lower third receive separate branches; taking into consideration the position of the fœtus *in utero*, one can easily see how readily the circulation of the lower half of the muscle may interfere with it by pressure of the shoulder upon the neck. In many cases, no doubt, do trophoneurotic processes exaggerate the effect of this anæmia. The induration of the sternocleidomastoid muscle, from a pathological point of view, is comparable to an hemorrhagic infarct. The induration may disappear without resulting in any structural changes, but occasionally it leads to the familiar contractures. The author goes on to present an itemized report of 37 cases which have come under his observation in Kredel's clinic. The treatment consisted in the performance of the open operation, and in the persistence for a long time afterward of appropriate postoperative treatment. The results, in a general way, may be said to have been thoroughly satisfactory. In all the cases symmetry was restored. Active and passive motion to the right and left side was possible in 18 cases. In 3 cases the head could be turned as well toward one side as toward the other. The author prefers this operation to the method of Mikulicz, not only because the results are quite as satisfactory, but because the cosmetic effects are very much better.

Carotid or Intercarotid Body. Tumors of the carotid body have been observed more or less frequently of late, although they cannot by any means be said to be very common. It is more than probable, however, that in many instances heretofore the true nature of the condition has not been recognized, and, as a rule, they have probably been looked upon as tuberculous lymphomata or malignant glands. In 1888 Jonathan Hutchinson gave an account of some instances of a peculiar growth springing from the upper third of the anterior triangle of the neck, to which he gave the name "potato tumor." It is more than likely that many of these were endotheliomata of the carotid body. Of these growths he said: "It has no connection with the parotid or face, but grows under the sternomastoid. From beneath that muscle it pushes its way both behind and forward, and assumes the shape of a huge kidney potato. It can never at any stage be recognized as consisting of separate glands, and it seldom shows any tendency to implicate or cause enlargement of adjacent glands, but, having once begun, it grows rapidly as a continuous, very firm, nodular mass. From its form and its hard nodosities, I have been in the habit of calling it the submastoid potato tumor. Its growth is usually so rapid that it produces death within a year or eighteen months from its beginning. It brings about death by its growth, its pressure upon adjacent parts, and by the bleeding and discharges which attend its ulceration. So far as my knowledge extends, there is no tendency to the production of secondary tumors. I have seen at least eight examples of it. . . . . In several cases portions removed for microscopic examination have been pronounced 'round-celled sarcoma,' or 'lymphosarcoma.' I am not familiar with any growth of quite parallel clinical history in any other region. . . . It may be conjectured that it begins in the submastoid glands, but, if so, it is very remarkable that neither can its gland enlargement stage be recognized nor does it spread to the glands. Nor must it be forgotten that cystic tumors also are sometimes developed in this precise situation. On the supposition that it begins in lymph glands, it is further very difficult to account for the fact that it always forms under the upper third of the muscle; never lower down." Guilford[1] reported 3 cases of this condition, all occurring in middle-aged or old men, 1 of them affecting both sides of the neck, and associated with metastasis in the liver. Upon 2 of the cases he operated; in 1 he found it necessary to remove the common and internal carotid arteries, the internal jugular vein, the vagus and descendens noni nerves, and in another the carotid arteries and internal jugular veins. The first patient died on the seventh day after operation. The other survived the operation, and finally died from exhaustion five months later. In the mean time the growth had recurred and grew far more rapidly than it had done at first. In all 3 cases the growths were apparently of a high degree of malignancy, and sprung from one particular situation in the neck. Their position, their relation to the carotid arteries, and penetration of the carotid sheath at the point of bifurcation, all pointed to an origin from a structure situated in this neighborhood, and this structure is the carotid body. In respect to the malignancy of these tumors, there is some difference of opinion. Reclus, for example, is of the opinion that these growths are probably not malignant, and for this reason, as for others, advises surgeons to abstain from operations unless the tumor gives rise to some severe functional disturbances. Marchand and Kopfstein disagree with Reclus, and state definitely that the tumors in their cases were malignant. In the opinion as to operative interference, Reclus probably stands alone. Funke[1] records a case of a middle-aged man who presented himself with a tumor in the region of the angle of the jaw, of slow growth and about six years' duration. At the operation it was found firmly adherent to the carotid vessels, and in attempting to remove the growth it was necessary to remove them. The patient died not long after the operation, of cerebral anæmia. The author gives a brief *résumé* of our present knowledge as to the embryology and histology of the cartoid body, together with an outline of the symptoms and of the diagnosis. He submitted a table of some 15 cases, the majority of which will probably be found in the collection of Scudder and in that of Reclus and Chevassu.[2] From his own investigations, he is inclined to believe that the carotid body is not present as often as is generally maintained. In eight fœtuses examined, it was present only once. In one fœtus the cervical ganglion occupied the position of the carotid body, and it was only after careful microscopic examination that the nature of the structure was recognized.

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[1] Deutsche Zeitschrift für Chirurgie, Band lxxiii., Heft 4–6.

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[1] Practitioner, December, 1904.

Mixed Tumors of the Parotid Glands. The etiology and pathology of these tumors offer an attractive field for investigation. Wood[3] presents his views, which are based upon the results of clinical and pathological study of some fifty-nine specimens. They can be divided macroscopically into three great rough groups with characteristic morphology, and to a certain extent with a definite clinical course. First, the very fibrous tumors, with but very little similar structure and with very little mucous degeneration and no cartilage; secondly, the very hard tumors, containing large masses of cartilage and but little connective tissue or cellular parenchyma; and thirdly, the soft, very cellular growths, with transparent trabeculæ of mucous tissue, surrounding areas which are opaque and yellow, and on microscopic examination will be found to be dense cellular areas, the color being occasionally, though not always, due to fatty degeneration or necrosis of the cells. The first and second forms are likely to be benign in their clinical course, while the third is likely to recur locally or to run an exceedingly malignant course. A few of the tumors belong to the first group, about one-quarter to the second, while the majority belong to the third. The average duration of these tumors until they caused the patient to seek surgical aid was, in Wood's series, eight years and nine months. As to the clinical course, it may be said that some 25 per cent. undergo changes which express themselves in a clinical malignant course, while about 30 per cent. recur after operative removal. The record of Wood's series differed in that 45 per cent. recurred locally. In 4 cases internal metastasis was soon apparent, and the local condition was so serious that the patients either died of operative shock or the tumors became inoperable from the invasion of the bone and deep tissues of the neck. In 12 cases, or 33 per cent., there were local recurrences which were checked by operation. The malignancy of this growth can be judged to a certain extent by their slowness of growth and their physical characters. When the growth of these tumors suddenly becomes rapid, the clinical and microscopic evidence of malignancy are usually manifested. In attempting to explain the sudden change which takes place in benign growths and causes them to become malignant, Wood suggests that the presence of a dense fibrous capsule may prevent tumor cells from spreading through the tissues, and that when this capsule is removed by operation on a quiescent tumor and small portions of the tumor cells are left behind, a rapid recurrence is the rule and the new-growth may reach a bulk in a few weeks greater than that of the original tumor. Another feature which should be taken into consideration is the increased vascularity of the tissues in cases of recurrence. The comparative absence of bloodvessels in the primary tumors is noteworthy. A third factor which he believes to be worthy of consideration in the development of malignancy in these growths is the presence of abundant embryonic connective tissue. It seems likely, he says, that the embryonal connective tissue of the original growth undergoes a change which expresses itself in the formation of the rapidly growing sarcomatous tissue. As to the etiology of these growths he is inclined to agree with those who explain them on the assumption of an embryonic misplacement of the mesoblastic tissue. The structure of the parenchyma is so slightly characteristic in morphology that its epithelial nature in all cases can only be considered as probable; yet in about 25 per cent. of the tumors examined the presence of epithelium is undoubted, and the form and relationships of the cells of the parenchyma did not furnish sufficient data to justify these cells being regarded as of endothetial origin. The theory of early embryonic displacement of epiblastic tissue during the process of formation of the parotid and submaxillary glands and the branchial arches may account for many of the morphological peculiarities of the cells of these tumors, especially the lack of many typical features which are associated with them. The same condition may be seen in the epithelial cells of the congenital moles, in which the epithelium is with difficulty distinguished from connective-tissue cells owing to its close connection with the stroma of the tumors and its undifferentiated type. The mixed tumors of the salivary glands run a clinical course strikingly different from the sarcomata and carcinomata in that they are slow growing and generally benign, the original lymph nodes are not infected, and the recurrences are likely to remain local in a considerable proportion of the cases.

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[1] American Medicine, July 16, 1904.

[2] PROGRESSIVE MEDICINE, March, 1904, pp. 81–82.

[3] Annals of Surgery, January and February, 1904.

The tumor which Keen[1] removed was interesting because of its enormous proportions. The weight was estimated at about seven pounds. The pathological diagnosis was myxochondrolymphangioendothelioma. The slow and later the rapid growth of the tumor, its enormous size, the age of the patient (sixty-five), and the fact that it was possible to dissect it away from the important structures seemed to justify the report of such a case.

Secondary Fatal Parotitis. Following operations upon the pelvic viscera, as well as upon the abdominal organs, parotitis is not a very uncommon complication. In some instances it undergoes resolution without any active surgical measures, but more often an incision for drainage is required. The prognosis in most cases is good. Brennan Dyball[2] reports a case of secondary parotitis which terminated fatally following operation for gangrenous appendicitis. Four days after the operation the right parotid gland became swollen, tender, and gradually increased in size. The fever increased and the patient evidenced other symptoms of sepsis. It was not until the eleventh day that a small spot of softening was detected. Under chloroform anæsthesia the abscess was incised by Hilton's method and liberated no more than half a drachm of thick pus. Subsequently other abscesses were opened, but the patient died on the fifteenth day after the operation and eleven days after the onset of parotitis. In English, American, and French literature only 6 cases of fatal parotitis have been reported. Death in this case was evidently due to the virulence of the infection.

Cervical Lymphatic Nodes. Dollinger[3] publishes a more detailed report of the so-called subcutaneous operation which he recommended last year for the removal of tuberculous glands of the neck. He claims that the method is applicable to all lymphatic glands, no matter whether situated in the posterior cervical triangle, along the course of the parotid vessels, in the submaxillary region, in the region over the parotid, or behind the ear. He reports his final results upon a series of 128 cases, in 107 of which the wounds healed *per primam*, and in the remainder after more or less prolonged suppuration. The advantage which this operation has over those in which the incision exposes the field of operation is wholly a cosmetic one. After the parts have been shaved and thoroughly disinfected just within the margin of the hair, in the region behind the ear, beginning on a level with the external auditory meatus for a distance of about 6 cm., the incision is carried down to the sheath of the splenius capitis, care being taken to avoid the occipitalis minor nerve. The further course of the operation varies according to the situation of the glands. The author claims that the removal of the glands can be thorough enough to prevent recurrence; even if glands too small to be seen or felt by the subcutaneous manipulations should be overlooked and left behind, the adoption of proper hygienic measures will prevent any recurrence of the previous condition. According to the author, if the glandular swelling has existed for a period of from two to four years, this of itself is a sufficient guarantee that the tuberculous process in that particular case has run its course. Without having had any personal experience with this operation, I cannot but feel that on general surgical principles the operation is not one which will appeal to the surgical profession. The tendency of modern operations for the removal of tuberculous glands of the neck has been in the direction rather of a more extensive incision and correspondingly more thorough and radical removal of the affected chain of glands. It is difficult to conceive how with any safety or assurance one could remove chains of glands which are situated deep along the course of the vessels beneath the sternocleidomastoid muscle, extending sometimes down as far as the clavicle, and especially, as is so often the case, when the capsules of the glands are adherent to such important structures as the contents of the carotid sheath, and surround such important structures as the spinal accessory and hypoglossal nerves. True, the author does not attempt to carry out his operation in those cases in which the tumor is not freely movable; but from my own experience I should say it was impossible to determine beforehand to what extent the glands were adherent to the surrounding structures.

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[1] Journal of the American Medical Association, April 30, 1904.

[2] British Medical Journal, April 30, 1904.

[3] Deutsche Zeitschrift für Chirurgie, Band lxxii., Heft 1–3.

Toxæmia Associated with Tuberculous Lymphatic Glands. Previous to the operation for the removal of a large mass of lymphatic glands of the neck, the patient exhibited symptoms of a profound toxæmia. Within ten days of the operation these symptoms had disappeared entirely. Etting[1] has been unable to find in literature any report of a similar condition. Microscopic examination proved the glandular involvement to be of a tuberculous nature.

Effect of X-rays upon Tuberculous Glands. A sufficient number of observations have been made to demonstrate the effectiveness of the

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[1] American Medicine, April 2, 1904.

x-rays in the treatment of tuberculous adenitis. In some cases the glands disappear entirely under this treatment, in others and probably the majority the glandular mass is reduced in size to a greater or less degree. The case which Vale[1] reports presents two interesting features. In the first place the case was one of that exceptional kind in which the course is acute rather than chronic, and the constitutional disturbance very marked. In the course of six months since the onset of the disease, the patient lost fifty-five pounds. The second interesting feature was the rapid restoration to health which followed the application of the x-rays twice a week. In the course of four weeks the swelling in the neck had been reduced in size one-half, and the patient had regained his normal well-being and strength. What remained of the glands were removed by an operation and the diagnosis confirmed by microscopic examination. The patient then developed symptoms of a cerebral lesion, which was assumed to be a tuberculous meningitis; the head was now exposed to the x-rays and, strangely enough, the symptoms rapidly subsided.

Beckett's[2] experience with the x-rays leads him to believe that the x-ray treatment is superior to the operative treatment in many ways. In the first place it avoids the disfigurement of a scar, but, what is still more important, the rays act not only on the glands, but on the primary source of infection, and thus guards against recurrence. The results are so much better, he believes, than by operation, that were it not for the extra time and trouble most persons would prefer it. Not only do the glands disappear, but the patient invariably gains in weight and strength. The effect of the rays upon the tissue seems to continue for some time after the treatment has been discontinued. In what way precisely the x-rays affect the tissue is still a matter of conjecture; the beneficial effect is not attributed to any bactericidal action, but rather to the production of a condition of the surrounding tissue which is inimical to the existence and growth of the bacilli. The duration of treatment varies according to the severity of the case, but, as a rule, from one to three months will be required. Beckett prefers a tube of the highest practical state of vacuum because of its greater penetrability and because he finds that with this tube he can give longer exposures and can use a stronger current before a troublesome dermatitis arises. If the gland has already broken down he drains through a very small opening and applies the x-rays as in non-suppurating cases.

X-rays in Hodgkin's Disease. Under exposure to a very high tube for a period of forty to ninety minutes, the tube being moved at intervals of ten minutes from one area to another, the cervical glands and presternal tumor gradually disappeared. Finch[1] subjected his patient to sixty-two exposures. He seemed to be in perfect health, looked and felt well, and gained fourteen pounds since the treatment was begun. The clinical picture and the results of the blood analysis and a microscopic examination of a section of the glands removed all pointed to the case as one of Hodgkin's disease. Four months after the treatment had been discontinued the presternal tumor recurred and was found to be almost as large as before the treatment had been instituted, but under the influence of further exposures the tumor entirely disappeared.

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[1] Medical News, January 30, 1904.

[2] Australasian Medical Gazette, May 20, 1904.

Pulsating Exophthalmos. It has been contended that true pulsating exophthalmos cannot be casued by a circumscribed *aneurysm of the internal carotid*, that the symptoms only appear if the artery ruptures and the blood enters the veins. The recent report of a case by Barnard[2] is of interest as offering evidence contradictory to this dictum. After a self-inflicted gunshot wound the symptoms of pulsating exophthalmos appeared; the common carotid was ligated and in ten days the pulsation ceased. In removing the bullet, which lay in the petrous bone, a small abscess cavity was opened and evacuated, but the patient died two and a half months after the injury. There was evidence of cerebral compression, caused by a large abscess in the temporosphenoidal lobe which did not communicate with the abscess around the bullet. A careful dissection of the internal carotid was made and the following interesting conditions were noted: (1) a double sacculated aneurysmal dilatation of the intracranial portion of the internal carotid; (2) no arterial communication with the sinus; (3) the absence of any fracture to account for the aneurysm found at the posterior part of the cavernous sinus; (4) the absence of any noticeable dilatation of the sinus or ophthalmic vein. Here was a case, then, in which all the typical signs of a traumatic pulsating exophthalmos were found to be due to a sacculated aneurysm of the internal carotid artery, and not to an arteriovenous communication; a case in which the lesion followed a head injury without being directly caused by a basal fracture; a case which proves that the signs of pulsating exophthalmos are not necessarily due to the presence of arterial blood in the ophthalmic veins and need not be dependent upon excessive dilatation of these veins.

With reference to the treatment of this condition, Murray[3] voices the almost universal opinion that, once the condition is recognized, surgical treatment should be promptly instituted. Compression of the common carotid, if used at all, should be restricted to cases of idiopathic aneurysm and perhaps to the aged. The percentage of success is so much greater after ligation that this may be said to be the operation of choice. The mortality after ligation in cases of exophthalmos is, according to Murray, 10 per cent., and in a certain percentage of cases—about 6 per cent.—secondary cerebral disturbances have developed. Boden in 1899 collected all the reported cases of traumatic exophthalmos treated by ligation of the common carotid. They were 58 in number, with the following results: cured, 46 per cent.; improved, 35 per cent.; unimproved, 10 per cent.; died, 10 per cent. Thus, in 80 per cent. of cases the operation was followed by cure or improvement; in 6 cases blindness resulted because the operation was done too late. Four of the 6 cases were due to sepsis and hemorrhage, complications which are less likely to occur to-day than at the time when these accidents occurred. Recurrence is due to the establishment of the collateral circulation before the clots, which have formed, became fully organized. Inasmuch as the superior thyroid artery plays such an important part in the establishment of the collateral circulation, Ligouet, failing to secure any improvement after ligation of the common carotid, ligated the external carotid artery just below the origin of the superior thyroid and a complete cure followed. Murray believes tying of the internal carotid offers a better prospect of success, and therefore should be preferred to ligation of the common carotid artery.

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[1] Medical Record, May 14, 1904.

[2] Annals of Surgery, May, 1904.

[3] Ibid., March, 1904.

Altogether 6 cases have been reported in which both common carotid arteries were ligated; 4 of these were cured, 1 was improved, and 1 was a failure. In cases of recurrence after ligation of one common carotid Murray suggests that before resorting to ligation of the other the mass of enlarged and pulsating veins at the inner angle of the orbit should be tied off. This suggestion is based upon the results of a similar mode of procedure recorded by Dollinger and Woodward. The former after the symptoms recurred, through an incision above the supraorbital arch, tied off several small veins and then resected about half an inch of the enlarged and thickened superior ophthalmic vein. Woodward ligated the enlarged veins at the inner angle of the orbit. Both cases recovered entirely.

Cirsoid Aneurysm in the Branches of the Internal Carotid Artery. In addition to the presence of a tumor appearing at the time of birth over the right orbit, but now extending midway to the occiput, there were evidences of pressure upon the right olfactory nerve, the right optic nerve and commissure (caused by dilatation of right anterior cerebral and ophthalmic arteries), the right oculomotor and crus cerebri (caused by dilatation of the posterior communicating, postcerebellar, and subcerebellar arteries), and upon the eighth and ninth nerves by dilatation of the anterior cerebellar artery. The author, Heitmüller,[1] believes ligation of the internal carotid artery would be of no avail on account of the free arterial anastomosis, but he looks forward to some amelioration of the conditions when menstruation is established.

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[1] Journal of the American Medical Association, March 5, 1904.

Extracranial Aneurysm of the Internal Carotid Artery. This is an exceedingly rare condition and one concerning which many mistakes in diagnosis have been made. Werner[1] was able to collect but 11 cases, to which Blauel[2] contributes 1 more. His patient was an elderly woman who for two years had an aneurysm of the internal carotid artery. She suffered chiefly from slight difficulty in swallowing and from the unpleasant effects of the pulsation. As the result of a fall the sac ruptured and the true aneurysm became converted into a false one. The swelling increased so in size that the difficulty in swallowing immediately became very much exaggerated and severe neuralgic pains were complained of. While treating the aneurysm with subcutaneous gelatin injections the aneurysm grew still larger. The patient had a sudden attack of dyspnœa, which was relieved only by a tracheotomy. The continued increase in size of the aneurysm and threatened rupture demanded some immediate intervention. Accordingly the common carotid was ligated and part of the sac extirpated. Blauel's case differed from those which were reported hitherto, especially in its dimensions. The aneurysm was much larger and therefore gave rise to more constant symptoms as a result of pressure on neighboring structures. It is sometimes difficult to differentiate between an aneurysm of the internal or external carotid artery, but when, as in Blauel's case, there is bulging of the posterior wall of the pharynx it is reasonable to assume that the internal carotid is involved. The relation of the internal carotid to this structure easily accounts for this symptom. Another point of diagnostic value is the alteration in the pulse; if the pulse of the temporal artery is delayed one would suspect the external carotid artery was affected, and if the temporal pulse on the affected side is synchronous with that in the other one would suspect the internal carotid. Alteration in the character and retardation of the temporal pulse are, however, not necessarily pathognomonic of aneurysm of the external carotid, for it is quite possible that these conditions might be brought about by pressure of aneurysm of the internal carotid upon the external carotid. The advantages of a positive diagnosis are not only theoretical, since the prognosis will be affected by the seat of the aneurysm. Thus, for example, in those cases in which it is necessary to apply a ligature to the common carotid the prognosis would be very much better if the aneurysm was situated on the internal carotid, because the circulation of the brain had already been somewhat disturbed and diminished. Curiously enough the conservative treatment which was adopted in this case—gelatin injections—was followed by an increase in the size of the aneurysm. Of further interest is the cause of the sudden attack of dyspnœa. The symptoms seem to point to an œdema of the larynx, and it is not unlikely that the increase in the size of the aneurysms interfered with the blood and lymphatic supply of the larynx. The effects of ligation of the common carotid were not only prompt, but surprisingly good. Not only did pulsation disappear immediately after the operation, but never returned. Although the pulsation ceased, the aneurysm did not diminish in size, so that it was necessary to operate again and relieve the effects of pressure still exerted by the aneurysm sac. Accordingly four weeks later the sac was opened, the contents evacuated, and the sac packed with gauze. Briefly stated, the interesting features of this case would seem to be the difficulty attached to the diagnosis; the sudden increase in the size of the tumor, which led to complications endangering the life of the patient; the pharyngeal occlusion, the œdema of the glottis, and the absolute cure following ligation of the artery.

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[1] Deutsche Zeitschrift für Chirurgie, Band lxvii.

[2] Beiträge zür klinische Chirurgie, Band xxxix.

Primary Ligation of Internal Jugular Vein. In all cases in which there is reason to suspect that the lateral sinus is either the seat of infective thrombosis or is likely (chiefly in tuberculous cases) to be exposed to damage during the removal of diseased bone during the operation or the subsequent dressings, Nicoll[1] advocates ligation or ablation of the jugular vein as the *first* step in the operative treatment. Preliminary *ligature* of the jugular vein is an operation of trivial risk. As the primary step in the operative treatment of the case, it is performed with clean hands and instruments. Ligature of the jugular, however, undertaken toward the end of a mastoidectomy when infective thrombosis has been discovered in the sinus, or performed hurriedly after accidental wounding of the sinus, is an operation which, performed with contaminated hands and instruments, carries grave risks of septic complications. *Excision* of the jugular vein, on the other hand, in cases in which, on exposure of the vessel, it is found that the infective thrombosis has extended down the lumen, constitutes an operation of some severity, the dissection extending in most cases from clavicle to mastoid. For this the operator must be prepared, even in cases in which the symptoms have given indication beforehand of the condition of matters revealed by the incision. Secondly, preliminary occlusion of the jugular vein, in cases in which there is reason, before operation on the mastoid, to suspect infective thrombosis of the sinus, constitutes the patient's main chance of recovery. To disturb the walls of a thrombosed sinus in exposing it, to palpate it for evidence of thrombus, and finally to open it and break up the purulent thrombus in removing it with the spoon over a patent jugular channel, sucking in debris with each inspiratory effort, cannot be regarded as sound surgery. Thirdly, preliminary occlusion of the jugular vein, in cases (most often in children) in which there is reason to suspect tuberculous caries, permits the performance of a much more radical mastoidectomy than can be attained in cases where a patent jugular vein converts an accidental wound of the sinus from a comparatively trivial incident to an accident bearing serious disadvantages and grave risks. Among the former is the limiting of the scope of the operation owing to the welling of blood with each expiration or the presence of the gauze plug inserted to check the flow. Such limitation is unfortunate, since cases of tuberculous disease commonly return repeatedly unhealed because of remaining or extending areas of caries. Anything which hinders the operator in his endeavor to radically extirpate the caries renders further operation in the future the more likely. Nicoll has made it now a routine practice to ligate the vein in all cases of mastoidectomy with or without opening the sinus, and in many instances the cases have been treated throughout as out-patients.

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[1] Scottish Medical and Surgical Journal, September, 1904.

Ligation of the lateral sinus preliminary to the removal of a parotid tumor is, so far as I know, a unique procedure. Lambotte[1] carried out this procedure in an operation for the removal of an enormous tumor, and found it so efficacious that he recommends its application to other operations in the cervical regions, as, for example, in the removal of tumors of the pharynx. Ligation of the lateral sinus is in itself a somewhat formidable procedure, and would add considerably to the gravity of an operation. If any precaution against hemorrhage is necessary or advisable it would be a much better plan to arrest the arterial circulation by temporary closure of the common carotid or by ligation of the external carotid.

Subhyoid Bursæ. The gross anatomy of the bursæ of the neck has been studied by a number of observers, but there does not seem to have been given any attention to the histological structure. Andrus[2] has made a number of dissections to confirm the work of other observers and to demonstrate the histological structure of this section. In most cases there was no distinct limiting membrane lining the whole of the cavity, but in places there was a suggestion of such a membrane lined by flat endothelial cells. According to Schafer, the subcutaneous bursæ are more like mere recesses in the subcutaneous areolar tissue than true sigmoid sacs. As a rule, there are but few suggestive symptoms. The latter are proportionate to the size of the tumor and are caused by the mechanical presence of the growth. In many instances these cysts have a tendency to become inflamed and to rupture spontaneously, leaving behind a chronic fistula. The diagnosis between median branchial cysts, thyroglossal cysts, and cysts of the subhyoid bursa may give rise to some difficulty. The important diagnostic feature is the histological structure of the sac. If the wall of the sac is lined by ciliated epithelium the cyst is a branchial or thyroglossal duct cyst; if lined with flattened epithelium it is of bursal origin. In but few of the cases which have been reported has a microscopic examination been made to prove the precise nature of the cyst. By far the most satisfactory method of treatment is complete extirpation. Difficulty has often been experienced in dissecting out the entire sac. After advocating this Weir suggested the injection of the sac with melted paraffin, which was allowed to harden before attempting a dissection. Anderson records two cases which he believes to be instances of subhyoid bursæ, although no histological examination of the wall of the sac could be made.

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[1] Journal de chirurgie et annales de la Société belge de chirurgie, January, 1904.

[2] American Journal of the Medical Sciences, March, 1904.

Status Thymicus. To this condition have frequently been contributed sudden deaths during or immediately after the state of narcosis. If the existence of this condition can be demonstrated it has been regarded as a contraindication to the use of general anæsthesia. Whether or not these sudden deaths are to be regarded as the direct result of the administration of the anæsthetic is a question. Some observers, notably Kundrat, believe that death of patients with status thymicus is not due to chloroform or ether intoxication, but that it is an accident which is due rather to an excitability of the heart or of the nervous system, and might occur under any circumstances when this condition prevailed. Nettel[1] reports from the clinic of von Eiselsberg a case in which death occurred fifteen minutes after the completion of an operation for the removal of an enlarged thyroid gland under local anæsthesia. When the patient left the table there was no cause for immediate alarm. Suddenly the action of the heart was arrested and all efforts at resuscitation failed. The autopsy revealed the condition which Paltauf describes as the status lymphaticus. This is evidently a case in which death could not be attributed to the use of a general anæsthetic, since the operation was done under local anæsthesia.

Polypoid Growths at the Base of the Skull. In the removal of polypoid growths which are of dense consistence, sessile, and have an extensive attachment to the bone, a preliminary excision of the upper jaw affords the best access to the growth and the most effectual means of controlling hemorrhage. Leaving the orbital plate of the superior maxilla intact and fitting an obturator to the roof of the mouth, the resulting deformity will be very slight. This method was adopted by Southam[2] with gratifying results. At first he thought that access could be obtained by simply turning the jaw outward, but as the exposure thus afforded was insufficient he performed a partial resection.

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[1] Archiv für klin. Chirurgie, Band lxxii., Heft 3.

[2] Lancet, April 9, 1904.

Pharyngotomy for the Removal of Foreign Bodies. In the extraction of foreign bodies from the pharynx or œsophagus Quenu and Sebileau[1] recommend an operation the technique of which was elaborated on the cadaver and successfully applied in two cases, once for the removal of false teeth and once of a needle. The operation is, in effect, a retrothyroid pharyngotomy. An incision at least 8 cm. long is made along the anterior edge of the sternocleidomastoid muscle, extending at least 2 cm. above and below the upper and lower margins of the thyroid cartilage. The deep cervical fascia is divided in a line parallel to the cutaneous incision. The muscle is reflected backward and the constrictor muscles searched for. Before exposing these it will be necessary to divide the superior pedicle of the thyroid gland between two ligatures. Directly beneath may be seen the fibres of the inferior constrictor. A hook retractor is engaged in the posterior edge of the thyroid cartilage. By drawing the latter forward easy access to the lower third of the wall of the pharynx below the lingual artery and the main thyrolingual facial vein will be afforded. The wall of the pharynx is now incised and its cavity explored. The simplicity of the operation, the ease with which the pharynx may be explored, and the foreign bodies removed without inflicting undue traumatism, render it, according to Quenu, the operation of choice.

Bursting of Tuberculous Abscesses into the Trachea. Although tuberculous changes in the peribronchial or peritracheal glands are frequently found, it is surprising, as Gancliana[2] points out, how seldom any grave symptoms or serious accidents occur. He reports the case of a child, aged three, who died suddenly as a result of the discharge of the contents of a tuberculous glandular abscess into the air passages. The case was thought at first to be one of diphtheria, and when the dyspnœa became intense a tracheotomy was performed. The child died almost immediately and the true nature of the condition was not revealed till the autopsy. In determining the actual seat of obstruction to the air passages one should always note the character of the voice. In laryngeal obstruction one would expect to find always some alteration in the voice, but when the obstruction is lower down the voice is practically unaffected. This accident almost always happens to young children.

Fatal Hemorrhage After Tracheotomy. According to Taute[3] 85 cases of fatal hemorrhage after tracheotomy have been recorded, and in all but 10 per cent. the subjects were children. In but a small number does the hemorrhage arise from injury to the common carotid. It is estimated that in about 2.5 per cent. of the fatal cases of tracheotomy death is due to hemorrhage. Blood in the sputa and localized pain suggest the presence of an ulcerative area, and should at least warn the surgeon of the possibility of hemorrhage. Usually, however, treatment is of no avail unless it be along the lines of prophylaxis. It is so difficult to control hemorrhage that most cases have been rapidly fatal.

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[1] Revue de chirurgie, June, 1904.

[2] Deutsche med. Wochenschrift, 1904, p. 874.

[3] Beiträge zur klin. Chirurgie, Bd. xli., Heft 1-2.

THE THYROID GLAND.

Lingual Goitre. In the great majority of cases the thyroglossal duct becomes obliterated, but sometimes this is not the case, since we find in adults the whole or parts of the duct remaining. It often happens that during the descent of the thyroglossal duct from the tuberculum impar small diverticula are formed jutting out from the sides of the canal, and these may persist after the atrophy of the duct itself. The epithelium of these diverticula proliferates and thus are formed several masses of glandular tissue similar in structure to the thyroid body and known as accessory thyroid glands. These glands may be divided into two classes, those occurring above the hyoid bone and those below. In 1853 Berneuil was the first to discover a small glandular mass above the hyoid bone. These masses vary in size from a hemp-seed to a pea. They may be encapsulated or free in the deep muscles of the tongue, but as a rule are attached to the hyoid bone by a fibrous ligament, which is supposed to be the remnant of the thyroglossal duct. Histologically, they resemble the thyroid body. It is only when a pathological process is set up in one of these glands that the patient is aware of their presence and applies to a physician for relief. Storrs[1] has been able to collect but 32 cases of lingual goitre, so that it is apparently a comparatively rare affection. Upon analysis of these cases he found that the great majority occurred in women between the ages of fifteen and forty. The preponderance of cases in the female sex is difficult to explain, especially as we know that accessory thyroid glands are very much more common in men than in women. Goitre grows slowly and may exist for years without causing any annoyance, until some unknown cause stimulates its growth and produces symptoms. These are functional and not constitutional, and consist of trouble in swallowing, breathing, and speaking, accompanied by frequent hemorrhages. The first symptom is generally an uncomfortable feeling at the base of the tongue, a fulness in the throat, accompanied by a frequent desire to swallow. The symptom which is perhaps more characteristic than any other is profuse hemorrhage unaccompanied by coughing, vomiting, or pain, and coming on without any apparent cause. The occurrence of hemorrhage is due to the fact that not only the mucous membrane covering the tumor, but the tumor itself is extremely vascular. This rich vascularization is a striking and characteristic feature and of great value in the differential diagnosis. Examination of the mouth, even when the tongue is drawn out as far as possible, may not reveal the tumor, the presence of which is only determined by the use of the laryngoscope. There should be no difficulty in differentiating lingual goitre from malignant tumors, and as to benign tumors the difficulty should arise only in differentiating goitre from a dermoid cyst. Cysts, as a rule, are softer and more fluctuating, their color is yellow or brownish, and their surface not so markedly covered with vessels; while the membrane covering them is thinner and more transparent. They grow more rapidly; there is no latent period; their color is yellow; they lack vascularity and pit on pressure. There have been no postoperative deaths and no recurrences after operation. The only rational method of treatment is removal either through the mouth or through an incision in the superhyoid region. Selection of one of these operations depends upon the size or situation of the tumor. When the tumor is not of very great size and situated rather high on the base of the tongue, and when the patient's mouth is large and the tongue slender, the operation by the buccal route is to be preferred, because it is simpler, easier of execution, and leaves no scar. If, on the other hand, the tumor is large and low, the patient's tongue thick and short and the mouth small, one must then resort to the superhyoid method. Whether through the mouth or through the superhyoid region, the tumor is easily enucleated. The superhyoid operation may be performed as follows: An incision made in the median line from the chin to the thyroid cartilage, the hyoid bone is denuded and divided into halves and the incision carried through the mylohyoid and geniohyoid muscles to the tumor. After enucleation the hyoid bone is sutured with silver wire, and the muscles and gland closed with whatever suture material is desired.

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[1] Annals of Surgery, September, 1904.

Amyloid Goitre. Amyloid degeneration of the thyroid gland has been observed in a very limited number of cases, but 11 having been reported; still in all these thyroid involvement was secondary to amyloid degeneration of other organs. Von Eiselsberg[1] reports a case of amyloid disease of the thyroid gland in a man, forty-eight years of age, who had also amyloid disease of the liver and spleen, ascites, and œdema of the lower extremities.

Owing to the difficulty of respiration and deglutition, of which the patient complained, the enlargement of the thyroid gland was believed to be due to an amyloid growth, and upon its removal microscopic examination revealed a very distinct amyloid reaction, and on the application of the gentian-violet stain there were very few follicles found in the specimen. It was noted that the bloodvessels were not only very limited in number, but contained no blood and had evidently undergone colloid degeneration. This is the first case to be found in the literature in which an amyloid thyroid gland had so surrounded the trachea.

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[1] Archiv für klinische Chirurgie, Bd. lxxiii.

One of the interesting features of the case were the attacks of tetany to which the patient has been subject before he applied for treatment. These attacks may have been due to the almost complete disappearance of the parenchymatous elements of the gland. It is not surprising that in spite of the high-grade degeneration of the gland the attacks were not more marked, since, in carcinoma of the thyroid, where a gland is entirely infiltrated with the new-growth and there is scarcely a follicle left, it frequently happens that the patient remains free from attacks of this sort. The operation was unattended by any complications and the patient made an uneventful recovery. No reason could be assigned for involvement of the other organs.

Goitrous Fistulas. According to Payz[1] fistulous tracts to the thyroid gland may be due to traumatism, to foreign bodies, hydatid cysts, and neoplasms. The majority are consecutive to the evacuation of suppurative cysts. The fluid from the fistula may, according to the nature of the case, be serous, purulent, or hemorrhagic. The fistula may be situated either centrally or laterally, and this connection with the thyroid gland will be recognized by their displacement during deglutition. In most cases they run a chronic course and show no tendency to spontaneous closure. The treatment to be radical involves extirpation not only of the fistula, but the segment of the gland to which it is attached. In cases of long standing there may be so many adhesions to the skin, muscles, vessels, nerves, trachea, and œsophagus that the operation is very difficult.

Intratracheal Thyroid Tumors. There have been but 11 cases of this condition recorded in literature; 5 of these have been reported by Bruns.[2] The diagnosis of this condition is based upon the exhibition of dyspnœa in an otherwise healthy subject and the presence of a flat, subglottic, smooth tumor behind or on the side of the trachea. On account of the inflammatory reaction and possible infection it is generally considered bad practice to attempt to extirpate these growths by the endolaryngeal or endotracheal route. While it is possible that in any subject the administration of thyroid tissue may bring about certain retrograde changes in the tumor, the treatment in older persons should consist in a laryngotracheotomy whenever the symptoms demand intervention.

[1] Transactions of the Thirty-third Congress of the German Surgical Society.

[2] Beiträge zur klin. Chirurgie, vol. xli., Heft 1–2.

Invasion of the Trachea by Cancer of the Thyroid. Actual invasion of the trachea and œsophagus by a malignant goitre is rather a rare complication. Frequently symptoms referable to the trachea develop, but these are the result of compression and infiltration rather than to the extension of the growth into the lumen of these canals. In looking into this subject Viannay and Pinatelle[1] found that of 173 cases of malignant goitre only 8 per cent. showed tracheal involvement, and but 4 per cent. involvement of the œsophagus. Invasion of the latter will be attended with dysphagia, which may be purely mechanical or partly of nervous origin from compression on the vagi, with hemorrhages from the œsophagus and the regurgitation of blood-stained, glairy mucus. The symptoms of tracheal involvement are always most distressing. The dyspnœa gradually becomes more and more aggravated, until the patient almost suffocates. Frequently the growth from the trachea extends to the œsophagus and perforation follows, leaving a tracheo-œsophageal fistula.

Intraglandular Injections of Iodized Oil. The treatment of uncomplicated goitres by any except surgical measures has practically been abandoned; however, we read from time to time reports of cases which are still being subjected to various procedures of doubtful value. Thus, Dubar[2] reports his success with the administration of 5 c.c. of an oil containing 40 per cent. of iodine. In several instances the goitres shrank to a slight degree after six or more injections.

Surgical Treatment of Goitres. The Mayo Brothers' operative experience during the past fifteen years has been limited to 110 cases. These are summarized as follows: 34 were for exophthalmic goitre, with 6 deaths; 2 were for carcinoma of the thyroid, with 1 death on the third day from sudden collapsing of the trachea. The other, whose trachea was involved, required the permanent use of a long tracheal tube until death occurred fourteen months later. One case was a large lingual thyroid; 2 cases presented enlargements of the pyramidal lobe only, and these tumors were apparently separate from the remainder of the gland. The other cases, numbering 71, with 1 death from pneumonia on the eighth day, presented the various types of adenoma and colloid cystic goitres. In 2 cases there were large areas of calcareous degeneration. One case was a large cyst with sixteen ounces of fluid, and apparently involved the entire gland. Two colloid cystic goitres were very large, one measuring twenty-two the other nineteen inches across the tumor from one side of the neck to the other, and resting upon the sternum. In 3 cases the entire gland was apparently removed, but as this operation was by the enucleation method they considered it probable that there was some active gland tissue within the capsule or an accessory gland present, as there were no symptoms developed which could be attributed to the loss of the gland. As to the operative technique, they prefer the so-called Kocher collar incision, which gives the best exposure and the best cosmetic effect. In certain cases, if it is necessary to obtain more space, they split the lower flap in the centre down to the upper border of the sternum. In some cases the sternohyoid and thyroid muscles are retracted, but if necessary they have no hesitation in cutting a part or all of them and reuniting them by suture during the latter steps of the operation. The subsequent treatment of the tumor itself depends upon certain conditions. If the capsule is thick, equal, and the whole gland has disappeared into one rounded mass, the enucleation method of Socin is preferred; in cases of cysts they can be evacuated and the cyst wall removed. If the tumor is composed of adenomata or large colloid cysts, enough gland material will be left to functionate should it be necessary to remove the whole mass. In those cases—and these constitute a majority—in which the tumor retains the general normal contour of the gland, extirpation of one lobe, after the method of Kocher, is practised; and if there be retrosternal enlargements, these are delivered if possible with this lobe. The isthmus is crushed with forceps and ligated or closed by sutures. An exception to this rule is made when there is any difficulty in raising the lobe from the trachea and recurrent laryngeal nerve. Under such circumstances the capsule is incised under the lateral lobe and allowed to remain, the gland being separated from its surface. Usually free drainage is employed, either through a separate incision or through the vertical median incision above the sternum. In speaking of the anatomy of the thyroid gland attention is called to the attachments of the capsule and to its bearing upon the occurrence of dyspnœa. The capsule behind is divided into two layers, one enclosing the gland, the other passing behind the pharynx and œsophagus and blending with a firm band of connective tissue on each side of the cricoid cartilage. This peculiar formation of the capsule, by making lateral pressure opon the trachea, accounts for the dyspnœa which is often complained of in enlargement of the thyroid, and accounts also for the firm attachment even of large tumors to the trachea.

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[1] Revue de chirurgie, March 10, 1904.

[2] Le Progrès médical, January 23, 1904.

Shelden[1] follows the method of A. Pearce Gould, who advised division of the isthmus as the first step in dealing with the gland. He finds this procedure easier, safer, and more rapid than that usually performed. The inferior laryngeal nerve can be dealt with more safely, the tumors can be removed with much less injury to the gland, and when the dissection is done from within outward the inferior and superior thyroid arteries are more easily and quickly exposed. The operation, as he performs it, is carried out as follows: The gland is exposed by dividing the skin, fascia, and muscles. The next step is to pass a Kocher director or one blade of an artery forceps between the trachea and the isthmus. Usually he removes the isthmus, and in these cases clamps the gland with a stomach clamp between the isthmus and the lobe that is to be left. When one clamp has been applied, a second one is placed close to the first and an incision made between the two clamps. He now turns the isthmus and the lobe to be removed outward and separates the under surface of the gland from the underlying structures with the finger covered with a piece of gauze. This can easily and quickly be done without injury to the gland or to the structures on which it lies. The thyroid arteries are soon exposed as they enter the under surface of the gland. If a transverse incision has been made, the inferior thyroid is first exposed and clamped; if an angular incision has been used, it is easier to expose and clamp the superior thyroid before dealing with the inferior vessel. After the arteries are clamped close to the gland and cut, the removal of the remainder of the lobe is easily accomplished by blunt dissection close to the gland. The veins of the thyroid do not bleed after the arteries have been clamped, and the internal jugular vein, in the great majority of cases, gives no trouble. He used chloroform in most cases; when there was pronounced dyspnœa, local anæsthesia.

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[1] Medical Record, April 9, 1904.

Ricketts[1] prefers partial thyroidectomy as the operation of choice in all forms of goitre. He condemns all the non-surgical procedures, including the use of electricity, the seton, injections, and such surgical procedures as division of the thyroid isthmus and ligation of the thyroid arteries. He prefers chloroform for a general anæsthetic.

In a series of 42 operations for goitre Goris[2] practised intrascapular enucleation in 11 cases, intraglandular enucleation in 13, enucleation with intracapsular or intraglandular resection in 8 cases, thyroidectomies in 4 cases, total thyroidectomy in 1, and modified thyroidectomy in 2 cases. With reference to the indications for these varied operative procedures the author recommends intracapsular enucleation in cystic parenchymatous and parenchymatous cystic goitres situated beneath the capsule. This is the easiest operation and can be carried out in a very short time. Intraglandular enucleation, an operation analogous to the preceding one, is indicated in the same class of cases, and differs only in that it is necessary, upon reaching the tumor, to cut a section of the thyroid tissue. The third method, enucleation with intracapsular or intraglandular resection, is recommended in parenchymatous fibrous goitres in which the parenchyma cannot be perfectly decorticated. Partial thyroidectomies are much more complicated procedures than the three forms of enucleation on account of the necessity of ligating the vascular pedicles and searching for the recurrent laryngeal nerve. The operation is indicated in fibrous goitres which are not enucleable. Total thyroidectomy was called for only in cases in which the gland is the seat of malignant tumor or degeneration.

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[1] American Journal of Surgery and Gynecology, August, 1904.

[2] Bull. de l'Acad. royale de médecine de Belgique, t. xviii., No. 12.

Attention is called to the value of laryngoscopic examination in the diagnosis of those forms of goitre which Kocher has named *struma occulta*, in which the lesion is retrosternal and not visible on the surface. The danger of serious hemorrhage in operations upon goitre has been very much exaggerated. The author has noted that the position of the internal jugular vein is often anomalous, and in cases of goitres of considerable size. Usually this vessel is to be found behind and to the outer side of the goitre, and there is no danger of injuring it if the operator in searching for the vascular pedicles keeps close to the edge of the tumor. In one case Goris found the internal jugular vein upon the surface of the tumor immediately under the sternocleidomastoid muscle. The vein was in front and the carotid artery was behind. According to his views the only real danger of thyroidectomy is asphyxia, although he is not so willing to follow the dictum of Kocher in recommending that all operations be performed without general narcosis. Division of the recurrent nerve is not to be feared when one resorts to enucleation or intracapsular resection rather than thyroidectomy. In one case the nerve was divided, but in the course of a few months the patient recovered her voice entirely.

Operative Treatment of Graves' Disease. Each year, it seems, more operations for the relief of Graves' disease are being performed. The opinion among surgeons generally, I believe, is in favor of the operative treatment in certain selected cases, although this mode of treatment has not won over the approval of the internist; so that, as a rule, most of the cases which come into the surgeon's hands have already run the gauntlet of all known remedies at the hands of one or more physicians. It is our duty from now on to publish our successful cases, and at the end of five years to sum them up, and if possible put upon a satisfactory basis the indications for operative intervention.

The rule of the Mayos[1] concerning cases of Graves' disease which have come to them for operation is to operate if the patient's condition is fair, but if the pulse is from 130 to 160, or if it suddenly fluctuates in tension and rapidity, or if there is anæmia with swelling of the feet, the patients are placed upon the belladonna treatment for some days. The more severe types are also given *x*-ray exposures in addition, which is continued for two to six weeks. The operation which they perform is partial thyroidectomy. They do not wish to be understood as objecting to operations upon the cervical sympathetic, and recognize that good results have thus been obtained. They have used as anæsthetics cocaine, chloroform, and ether, the latter preceded twenty minutes by $\frac{1}{6}$ of a grain of morphine hypodermically. Cocaine is chosen for some of the worst types of nervous disease, especially with the rapidly fluctuating or irregular pulse, or if they lack confidence in the anæsthetist. It is interesting to note that they have been able to see no difference in the character or degree of shock or thyroidism in local or general anæsthesia. Ether is preferred to chloroform or cocaine. If during the anæsthesia mucus accumulates in the trachea and bronchi, the patient is allowed to come out of the anæsthetic sufficiently to clear the throat and then chloroform is substituted. The results are based upon their operative experience of 40 cases. Of those which survived the operation, 50 per cent. made an early recovery, 25 per cent. did so after several months, and 25 per cent. were improved, yet suffered from irregular recurrence of some of the major symptoms. There were 6 deaths. One occurred upon the table, 2 within the first twenty-four hours after operation, and 3 at from twenty-four to seventy-two hours. All these cases suffered from thyroidism and exaggeration of the previous symptoms. In their opinion thyroidism is not due to rough handling of the unbroken tumor, and in so doing forcing secretion into the veins, for if this was the case it would be equivalent to a hypodermic injection into the vein with an immediate effect, when in reality it comes after some hours and is due apparently to absorption of the wound serum with some thyroid secretion in suspension. For this reason wounds after operation for exophthalmic goitre should be drained as freely as would a septic process, and in order to check absorption either in the wound or gland the patient should be given sufficient amount of saline solution to replace the quantity of blood which was lost.

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[1] Medical Record, November 5, 1904.

Ligation of the Thyroid Arteries. Kocher, to whom we are so inclined to refer, concerning the operative treatment of goitre, still recommends in certain cases ligation of the thyroid arteries, or a combination of ligation and resection of the gland. The most important points in his mind are to reduce the vascularity of the gland and to avoid long and extensive operations. Schwyzer[1] was impressed with the rationale of this operation and carried it out in five cases, all of which were of a severe type and failed to respond to the numerous remedies which had been recommended as beneficial. On the first patient he performed three operations, first ligating the right inferior thyroid artery, later the right superior thyroid artery, and finally the left inferior thyroid artery. In the second case he ligated two inferior thyroid arteries and one superior at one operation. In the third, two from each superior thyroid arteries were found and ligated, but the operator could not find the left inferior thyroid artery. In the fourth case both the superior and the right inferior artery were tied, and in the fifth case partial thyroidectomy of the right lobe was practised. With the exception of the last case the symptoms were all alarming and the failure of non-surgical measures and the critical condition of the patient demanded operation. Four of the five cases recovered. The fifth died suddenly about four months after the operation, without apparent cause, after a most satisfactory disappearance of all the symptoms.

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[1] St. Paul Medical Journal, January, 1904.

Resection of the Cervical Sympathetic. Jonnesco[1] is still a strong advocate of this operation in the treatment of exophthalmic goitre. He still believes it to be the operation of election, that it is both rational and efficacious, and should be practised on the whole of the cervical chain of ganglia, and in addition on the first thoracic ganglion. It is safer, in his opinion, to perform the operation in two stages, and the results of the operation may not be expected for some time, there often being a period intervening between the operation and the date of improvement, in which the symptoms are for a time exaggerated. In the form of goitre which is presented in Basedow's disease resection of the sympathetic is contraindicated at first, the operation of election in such condition being a partial thyroidectomy. Resection of the sympathetic should be reserved for those cases in which the associated symptoms of the general disease are not relieved.

The X-rays in Exophthalmic Goitre. Having noted that the lymphatic system was greatly sclerosed in operating upon several cases of cervical adenitis which had been exposed for many times to the *x*-ray, Mayo[2] applied this treatment to ten cases of very marked exophthalmic goitre with the hopes, first of reducing glandular activity, and, secondly, of reducing absorption by its possible effect upon the lymphatics. Not any of the cases have been absolutely cured, but certainly they have been markedly benefited. Indeed, the benefit is such that he believes this method should soon be given a place in the treatment of Graves' disease, or at least should be made a preparatory treatment to the prospective surgical method. In all of these cases the symptoms were well developed, and in all of them other measures, medicinal and otherwise, had been tried and failed. In two of these the patients had recovered to such an extent that a diagnosis would at the present time be impossible.

Serum Treatment of Exophthalmic Goitre. Murray[3] regards the symptoms of exophthalmic goitre as due to a toxin, the toxin being developed in the diseased thyroid gland, and although the infectious origin

[1] Bull. et mém. de la Soc. de chir. de Bucharest, 1904, No. 6.

[2] Medical Record, November 5, 1904.

[3] Lancet, August 27, 1904.

of Graves' disease cannot be proven, he thinks there is no reason why an antitoxin cannot be obtained by the same methods which one would employ in cases of tetanus or diphtheria. Accordingly, he attempted to prepare an antitoxic serum by injecting rabbits with from 5 to 10 minims of liquor thyroidei for a period of about five weeks. The serum was decanted from the blood into small sterilized bottles to which 0.2 per cent. of carbolic acid was added. In the cases in which he employed the serum no very definite results were obtained, but he believes that if larger animals were employed and larger doses of thyroid extract administered, it would be possible to obtain a serum which would be efficacious in both acute and chronic cases.

Does Metastasis Occur in Benign Tumors? That a metastatic lesion could develop secondary to a benign tumor would seem at first sight to be paradoxical, since we are so in the habit of regarding this phenomenon as rather pathognomonic of malignant growths. And yet there are some exceptions. It has been demonstrated that chondromata may become generalized to such an extent that secondary deposits may be found in the lungs, heart, brain, and spleen. The same may be said to be true of cystic adenoma of the ovary. It has also been proven that myxomata may recur locally and even become generalized. Can the same be demonstrated of benign tumors of the thyroid? Patel[1] has collected 18 cases, including 1 not hitherto reported from Jaboulay's clinic, in which the bearer of an ordinary goitre of many years' duration, in whose internal organs, especially in the bones and the lungs, secondary growths had developed of a structure similar to the normal thyroid, without the goitre having undergone any apparent modification. Histologically considered, these growths belong to one of two classes, the benign and the malignant. The symptomatology of this condition is one of its most interesting features. In the first place there is nothing particularly noteworthy in the tumor itself or in the thyroid gland, because frequently the goitre is so small that its presence is unobserved. The duration and size of the goitre seemed to have nothing to do with the production of metastases. Secondary deposits are usually found in the bones and lungs, and the bones most usually involved are the skull, pelvis, and vertebræ. It often happens that there is nothing to indicate that metastatic lesions have developed, especially when they are situated in the internal organs. A metastatic deposit in the cranial bones, however, may give rise to symptoms of cerebral compression and those of the vertebral column to symptoms resulting from compression on the spinal cord, as in the case reported below by Hugnenin. As to the etiology, two hypotheses have been advanced by way of explanation. Housell believes that they originate in the parathyroids, while others, notably

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[1] Revue de chirurgie, 1904, vol. xxxix., No. 3.

Eberth and Wolfler, believe that in spite of its benign character the primary lesion is malignant. The majority of those who have studied the histology of these lesions, however, do not favor the latter theory. The treatment of these metastatic lesions may be either medical or surgical. Jager has tried opotherapy, but without success. When the metastatic deposits were situated in the long bones, the limb has been amputated, but Patel does not think that this is advisable, since one cannot be sure that there are not lesions elsewhere. Feurer operated upon a patient with a metastatic focus of the skull, and was obliged to penetrate into the cerebral lobe on account of the extension of the secondary deposit into the brain substance. It is generally believed to be better surgery to regard the lesions so situated as inoperable. In the case which was reported by Patel from Jaboulay's clinic a benign goitre had been stationary thirty years. It was uniformly hard and there were no pains, either spontaneous or on pressure. A metastatic tumor developed at the inner angle of the orbit in the left frontal bone. The tumor was removed and revealed parts in which the characteristic feature of normal thyroid tissue were exactly reproduced, while in other fields the picture was typical of a malignant growth.

METASTASIS FOLLOWING LESIONS OF THE THYROID GLAND. Using for his text a case which came to autopsy, at which was found a carcinoma in a colloid goitre with a single metastatic lesion in the thoracic vertebræ, resulting in kyphosis and myelitis, Hugnenin takes exception to the view that metastasis ever follows the existence of benign lesions, particularly adenomata, in the thyroid gland. In those cases in which metastatic lesions have been found, a carcinomatous area in the thyroid must have been overlooked. If clinically it is difficult to determine whether a thyroid exhibits any change, it is doubly hard to determine whether a recognized increase in the volume of the gland is merely a struma or a carcinoma with the help of a microscope. It is hard to distinguish between a carcinoma and adenoma and simple goitre. This is due to the fact that but few of the features, upon which the distinction is usually based in differentiating between benign and malignant tumors of other tissues, can be relied upon in making a differential diagnosis between various tumors of the thyroid. For example, in tumors of the breast one makes a diagnosis of carcinoma if the cell nests are not surrounded by a basement membrane; while this is of great significance in cases of carcinoma of the breast, it is of little value in the thyroid gland, because the normal and even strumous thyroid contain solid "zellstrange" not surrounded by a basement membrane.

Those modern authors who believe that a struma or adenoma will lead to metastasis do not explain how the thyroid cells gain access to the circulation. They can enter the bloodvessels, according to their views, by breaking through the vessel wall; this is precisely the way in which the cells of carcinoma gain access to the vessels. All the hitherto published cases of struma and thyroid adenoma which have led to metastasis I regard simply as carcinoma; those cases which were discovered only secondarily, and especially those in which it was proven unquestionably that the vessels were filled with masses of the neoplasm. Carcinoma of the thyroid differs from carcinoma of other organs in that it metastasizes chiefly through the bloodvessels. In the author's case this is the only way in which metastasis could have occurred. A retrograde metastasis through the lymph channels could not have existed, since no carcinomatous lymph glands could be found. If a retrograde metastasis through the lymph channels is improbable in Hugnenin's case, then should it be excluded in those cases in which metastases have been reported as occurring in the humerus and femur. Since, in Hugnenin's case, the lungs contained no secondary nodes, then must metastasis have occurred in one of two ways: either the malignant cells passed unhindered through the capillaries of the lungs, or through a patulous foramen ovale. In Hugnenin's case, as in the case of Gierkes, the foramen ovale was patulous.

Metastatic involvement of the vertebræ following carcinoma of the thyroid is not very common. Timacher noted it only once in 38 cases which had given metastasis. In investigating the question as to whether malignancy is much more apt to occur in those thyroid glands which are already the seat of a pathological condition, the author has collected statistics from which he concludes that malignant disease of the thyroid develops most commonly in a thyroid gland which has been proven by microscopic examination to have been already the seat of alteration in structure. In these statistics he finds also that malignant tumors of the thyroid are more common in women than in men, and that carcinoma is more frequent than sarcoma in the ratio of 7 to 5. The author sums up his conclusions as follows:

The primary tumor from which the metastatic lesion of the vertebræ originates is a simple carcinoma of the thyroid. This is a polymorphocellular carcinoma. It is comparatively benign and grows more slowly than does the metastatic lesion. There are no undisputed cases in which normal strumous or adenomatous thyroid has led to metastasis. Carcinoma of the thyroid is oftentimes so small that it might escape notice even after careful microscopic and macroscopic examination. The histological structure of the primary node and its metastasis remind one very often of the normal thyroid of the adult.

Thyroid Grafting. Christiani[1] has been investigating for a long while the ingrafting of thyroid tissue. His experiments have been conducted largely on animals. In his recent communication, however, he reports the results of his investigations in man. There were 3 cases in which he tried thyroid grafting. The first was that of a young woman from whom a portion of normal thyroid tissue was removed during an operation upon the neck. Her thyroid gland was normal and sections from it were implanted in her back between the shoulders and into a myxœdematous boy of twelve, whose thyroid gland had been removed. This boy was grafted with normal thyroid tissue from the first case and also with sections from his own gland, while the woman was grafted with sections from her own thyroid as well as those from the boy. As a result of an examination of portions of the transplanted sections of tissue which were excised from two to six months later, the author concludes that it is possible to graft thyroid tissue in man and that in so doing he can obtain neothyroid glands. It was also proven that when normal or only slightly altered tissue was used the experiments were successful, but when a section from a distinctly pathological gland was employed the graft underwent degeneration. The question as to whether thyroid grafting may be employed as a substitute for thyroid feeding is one which naturally suggests itself. Christiani is inclined to believe that thyroid grafting would avert the cachexia struma priva which develops after a too radical extirpation of the organ. When the subject is suffering from almost suppression of the thyroid function, the demands on the transplanted thyroid tissue are so great that the graft undergoes degeneration as a result of hyperfunction, but when the subject already has a normally functionating thyroid gland the graft atrophies from disuse. It is probable that the best results will be attained when but moderate demands are made on the grafts, as, for example, after a partial thyroidectomy.

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[1] Semaine médicale, vol. xxx., No. 11.

THE THORAX.

Mammary Gland. HYPERTROPHIED BREAST OF THE MALE. Jones[1] reports 2 cases of *gynæcomastia,* both occurring in boys who were members of a very primitive tribe of natives in Central Africa. In both cases the breasts were well developed and presented all the characteristics of the female breast in an individual of the same age. The increase in size was due mainly to dense fibrous tissue, but the number of acini were not less than would be found in the male gland.

SCIRRHOUS CARCINOMA OF THE MALE BREAST. The case, which was under Bell's[2] observation, was a well-marked one. The patient was fifty-six years of age and did not present himself for treatment until four years after the onset of the growth. At this time there was a large, excavating, ulcerated surface, the edges of which were hard, raised, and everted. The condition began as a small, hard lump about the size of a pea two and a half years previously. This had gradually enlarged until it was the size of a hen's egg, and then began to ulcerate. The growth and all the underlying fascia and muscle, together with a few small glands from the axilla, were removed and the defect covered with grafts. The patient noticed a recurrence fifteen months after the operation in the stump of the pectoralis major muscle. Soon there was evidence of internal metastasis, and from the effects of this he died, one year and nine months after the removal of the primary growth.

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[1] Lancet, March 26, 1904.

[2] Liverpool Medico-Chirurgical Journal, January, 1904.

SUPERNUMERARY BREASTS. The patient was thirty-eight years old, married, and when first observed by Young[1] she was nursing a baby four weeks old. On the left breast about 6 cm. below the nipple was another, somewhat smaller, but well formed, from which milk flowed whenever she nursed from the upper one. From external appearances these anomalies can be divided into two types: one polythelia, when multiple nipples grow upon what appears to be one breast, and polymazia, when the nipples appear on other parts of the body connected with a certain amount of isolated breast tissue. Supernumerary breasts are usually small and illy developed, but they are apt to increase in size during pregnancy. They are found, as a rule, along two lines which run from the anterior border of the axilla to the pubes, and are inclined to symmetrical arrangement. However, they are often irregularly distributed. The most interesting phase of the subject, of course, is the etiology. Various theories have been advanced as to the manner in which transplantation takes place. Young summarizes these as follows: "Ahlfeld says that by pressure of the amnion part of the cells become separated and are transplanted to other portions of the surface of the body. Förster and E. Hartung hold the same idea as to portions of tissue becoming separated, but express no opinion as to the manner of its occurrence. According to Leichtenstern many previously considered accessory breasts the result of aberration of the milk ducts, probably from the work of Meckel and Owen. St. Hilaire sought to trace polymazia back to the general plan of the lower mammals, and Darwin thought it due to atavism. Leichtenstern, Neugebauer, Billroth, and many others consider it a reversion to the previous types of our ancestors. Perls, on the other hand, has strongly combated the view of atavism, and Duval explained the axillary, as well as those appearing upon the back and acromion, as modifications of the sebaceous glands. Champneys has also advocated this view. However, Virchow remarks that it is not so easy to tell with which one is dealing, as their development is so similar. E. Martin believes that certain parts of the breast tissue are cut off from the mamma and lie near to the true breast. These are often felt as tumors, and swell with pregnancy and menstruation, but are not true accessory breasts. They may even appear in the axilla. Flechsig held much the same view for this class of cases, and Hartung gave to these structures the name of 'mammæ accessoriæ spuriæ.' The theory of reversion to some previous type has evidently the greatest number of adherents among the writers upon these subjects, and certainly offers the most satisfactory explanation for the appearance from time to time of these rather interesting deformities. For the anomalous position of such as occur on the outer side of the thigh and on the back some further explanation must be sought, and possibly in these very rare cases the transplantation theory of Ahlfeld may be correct. As regards the nipples which appear as accessories of the main nipple of the breast, the theory of Förster offers an adequate explanation and one in keeping with the embryological development of the organ. Neoplastic changes, according to E. Martin, are so rare in supernumerary breasts that he finds only one doubtful report in medical literature besides his own. At the same time he considers that the small 'lobuli aberrantes' about the breast should be watched and removed if they are the cause of discomfort, as new growths appear at times to start in these structures."

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[1] Boston Medical and Surgical Journal, March 24, 1904.

GALACTOCELE. In the classification of cysts of the breast one finds mention of the galactocele, a cyst which is due to obliteration, complete or partial, of the milk duct. The condition is indeed extremely rare. Keen[1] can only remember having seen the following case in his experience, in which he has probably seen from 800 to 1000 cases of breast specimens: The patient was a woman, twenty-nine years of age, who had a lump in her breast almost as long as she can remember, and believes that it began about the time her menstruation was first established, at twelve or thirteen years of age. At first it was only about the size of a lady apple. She was confined March 8, 1903. When she was about three months pregnant the tumor began to grow. At the time of her confinement it was about twice as large as at the present time. After her confinement the tumor began slowly to shrink. The breast contained milk after her confinement, but the nipple was flat and retracted, and she did not nurse the child from that side. When admitted to the hospital the tumor occupied more than one-half of the left breast, involving all of the inner lower quadrant and parts of the two adjacent quadrants. It was 10 cm. in diameter, was rather firm, markedly lobulated, elastic, not attached either to the chest wall or the skin. Apparently, the skin, however, was attached to the septa dividing the lobules. The nipple was flat, but not retracted; milk could be expressed from the nipple. There were no glands perceptible in the axilla or neck. The urine was normal. An elliptical incision was made, through which the entire breast was removed. The skin over part of it was so thin that in spite of the utmost care two of the smaller cysts were opened. Practically the entire mammary gland was involved in the cystic change. Upon section it was seen that the major part of it was one large galactocele, measuring about 6 cm. in diameter, with a number of subsidiary cysts of smaller dimensions. An examination of the milky fluid, which in some of the cysts was quite thick and creamy, showed it to be made up almost wholly of globules of fat. The pathological diagnosis was galactocele, acute non-suppurative interstitial mastitis, and slight chronic productive mastitis. According to Ziegler it sometimes happens that certain changes take place in the milk, and these excite inflammation and proliferation of the fibrous stroma.

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[1] Annals of Surgery, August, 1904.

In Keen's specimen there was in the stroma a marked periacinous infiltration of mononuclear cells and some increase of the interlobular and intralobular fibrous tissue. Many of the acini and ducts showed marked distention, several of which had coalesced to form cysts. The latter were lined by one or several layers of cuboidal or slightly flattened cells, and composed a fibrous wall, which in many instances was quite thick. In some of the cysts there was distinct evidence of proliferation of cells over those lining the cyst wall. In describing the symptoms and diagnosis Keen says the appearance of the tumor is generally rather sudden, usually soon after parturition, or at least during lactation, without any inflammatory changes, and with only the pain and discomfort incident to the tension and weight. Some of these tumors become excessively large. Scarpa reports one in a patient just the same age as the one reported, which occurred ten days after her confinement, and from which ten pounds of milk were evacuated. Milk was demonstrated to be present in the breast of the present case by pressure upon the tumor, which caused the milk to escape from the nipple. The content of such tumors varies extremely; sometimes it is like simple human milk; sometimes, when the watery parts have been absorbed, it is changed, as in this case, to an extremely rich cream, almost as thick as castor oil. Gross states that they may be filled with what appears to be pure oil, which coagulates into a substance resembling lard intermixed with crystals of margarine. In other cases the contents are like butter or cheese. In other words, all or any of the various products from milk may be present.

Primary Tuberculosis of the Breast. Tuberculosis of the breast is an uncommon affection, and those cases in which the mammary gland is primarily affected are still more rare. In the history of some of the larger surgical clinics, perhaps not a single case will have been observed.

Unless the case comes to autopsy one cannot establish upon a scientific basis the primary nature of the mammary infection. There remains a possibility of the existence of a tuberculous lesion unrecognized in the thorax or abdomen, but for practical purposes we must consider a tuberculous infection primary if there is no evidence of tuberculosis elsewhere, and providing, of course, that the histological picture of tuberculosis or the typical bacilli were found in the specimen or the presence of bacilli proven by inoculation experiments. On this basis Anspach[1] has by a process of exclusion collected 42 cases, 30 of which were taken from the table of Bartsch. In an analysis of the entire number of the accepted cases we find that 28, or 70 per cent., were married; 19, or 47 per cent., had children; 12, or 30 per cent., were single; 6, or 15 per cent., had a history of trauma; 8, or 20 per cent., suffered from mastitis during lactation; and 2, or 15 per cent., were directly inoculated.

No case up to this time has been observed before the age of puberty. The relative infrequency of tuberculosis of the mammary gland, as compared with genital tuberculosis, is alluded to by Hegar, Martin, and others, who explain this disparity on the ground that infection plays a very important part as a predisposing factor in genital tuberculosis, acting very much as trauma in preparing the soil for a later invasion of the tubercle bacillus. Several varieties have been described, such as the nodular or discrete, the confluent, miliary, etc.[2] The prognosis of mammary tuberculosis is on the whole favorable, provided there are no visceral complications. In most cases, if a radical operation is performed, it should consist of an amputation of the breast and the removal of enlarged axillary glands, and the patient will recover. During the period of lactation the possibility of this condition should always be borne in mind, since if the breast itself is the seat of tuberculosis its milk must be highly infectious. One case is reported in which the tuberculous record of the child has been traced to its mother's milk. Of course there are many instances of infection arising directly from the milk of tuberculous cattle, even when the udder was not involved. Included in Anspach's review of the subject is the report of a case in a multipara, fifty-nine years of age, with no tuberculous history, and no clue whatever to the probable source of infection; she had always used both breasts during lactation, and never had any pain in them. Three years before coming under observation a nodule appeared in the right breast; it increased slowly in size, and caused retraction of the nipple. The breast was amputated, and upon examination there was found in the region of the nipple an irregular nodule about the size of a walnut, not circumscribed, but fusing with the surrounding tissue. The microscopic picture was typical of tuberculosis, but no tubercle bacilli were found in the stained sections, and no animal inoculations were made.

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[1] American Journal of the Medical Sciences, July, 1904.

[2] PROGRESSIVE MEDICINE, March, 1904, p. 93.

The following is a case reported by Thurston:[1] A female, aged thirty-six, Hindoo. Four months before admission the patient noticed a swelling in the right breast and also in the axilla; the swelling in the breast increased, and finally an abscess burst. On admission the upper outer quadrant of the right breast was enlarged and indurated; in the centre of the indurated area was a small sinus discharging thin seropus; the skin was adherent. The axillary glands were enlarged, hard, and not painful; there was also another enlarged gland in the left axilla and several scars in the neck, the remains of previous abscesses. The breast was treated with a hot lead lotion and the induration largely disappeared, but the sinus persisted. The area surrounding the sinus and the axillary glands were removed; the latter were typically tuberculous to the naked eye, and the microscope confirmed the diagnosis.

CHRONIC MASTITIS; DIFFUSE FIBROADENOMA; MALADIE CYSTIQUE. Chronic induration of the breast with some enlargement in whole or in part is very commonly observed in middle life. This enlargement may be due to chronic interstitial mastitis or to diffuse fibroadenoma, or to a malignant tumor. In some instances it is possible to distinguish a chronic interstitial mastitis from a diffuse fibroadenoma, but the two conditions may appear in different parts of the same breast, and in some cases it may be impossible to determine whether the process found is an inflammation or a new-growth. Both may simulate carcinoma in their clinical and physical characteristics. Curtis and Wood[2] report a series of cases as types of these interesting conditions. The clinical picture is, in the words of Curtis, usually as follows: In a woman in middle life (whether single or married, childless or multiparous, appears to be of no consequence) an induration takes place in one or both breasts, involving the entire gland, or forming a distinct nodule in one portion. We rarely find the rest of the breast perfectly soft and healthy, even if the superficial examination reveals only one definite nodule. It is seldom that the patient has suffered from any injury or abscess formation which might be considered a cause of the changes. When the process is localized or limited to one nodule, a more or less distinct mass is felt, moderately hard, not freely movable in the breast, but rarely attached to the skin or deep fascia. If a cyst of any size be present the mass is usually elastic, but it is often hard and sometimes of stony hardness like carcinoma. Fluctuation can seldom be demonstrated, the tension and fluid pressure within the walls of the cyst being so great. Small cysts feel like shot or beans embedded in the tissues of the breast, and the larger ones, surrounded as they often are by thick, indurated walls, may exactly resemble a small carcinomatous nodule. Usually a nodular or granular induration can be felt in the rest of the breast by careful examination (pressing the gland gently against the chest while palpating with the fingers, especially at the margins), even when the patient complains only of the more evident portion or prominent tumor. When the disease has advanced equally in all parts of the breast the entire organ feels indurated, uneven on its surface, and when grasped between the fingers gives the impression of being made up of numerous nodules. In a certain number of cases there may be some adhesion of the skin and even retraction of the nipple, in spite of the denial of Bryant and other authorities that adhesion of the skin and retraction of the nipple are never felt except when carcinoma is present. A retraction of the nipple which is evident before operation occasionally disappears in the breast after removal, probably because of the loosening of the fibrous stroma which had drawn upon the nipple. The axillary glands are sometimes enlarged from inflammatory reaction, and they may be tender to pressure, but they are not so hard as is sometimes the case in carcinoma. As illustrating adhesion of the skin and retraction of the nipple, they quote two cases from several which they have seen.

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[1] Indian Medical Gazette, January, 1904.

[2] Medical News, August 13, 1904.

From the pathological point of view, according to Wood, three general types of these growths may be observed. The first, those in which the breast has recently been the seat of subacute inflammation, enter the ducts and involve the periglandular connective tissue. The process is rather a low-grade inflammation, and is attended with an increase of the periglandular connective tissue, desquamation of the glandular epithelium, and the formation of cysts. The second type are those which are more distinctly adenomatous in character, of which there may be said to be two varieties: in one the glandular acini are filled with masses of cells which have grown out from the walls of the cells, and in the other the lumen of the acini or of the cyst is filled with a papillary outgrowth which simulates an adenoma. In the third class of cases—the transition cases with malignant changes—the breast may contain a small, mobile tumor, with all the clinical and gross anatomical appearance of an adenoma, and yet carcinomatous changes may have taken place in some portions of the tumor and already invaded the axillary lymph nodes. It is rather characteristic of these tumors that, although the axillary lymph nodes are involved, only a minute portion of the tumor may be malignant, and the greatest patience is required to find the carcinomatous area. Thus the danger of relying on an examination of a small section of such a tumor removed for diagnosis.

The prognosis in these cases depends somewhat upon the stage of their development, especially upon the degree of induration. If there is marked induration, the possibility of its being malignant is greater than when induration is only slight. Curtis lays considerable stress upon the degree of induration, as he believes it constitutes the most reliable sign of the degree of pathological change and the consequent danger. The diagnosis from other lesions except carcinoma is usually easy. The object of Curtis' paper is rather to show that it is not important to distinguish these conditions from carcinoma, because they are so frequently followed by malignant changes that they should be considered practically preliminary stages of that dangerous neoplasm. For all practical purposes, therefore, these tumors should be treated as cases of early breast carcinoma. Curtis believes that the treatment may be varied according to the extent and degree of the induration, and attempts to classify the cases according to this basis. This it seems to me is rather an unwise procedure, as in hands more experienced than the author's mistakes may be made which would be detrimental to the interests of the patient. It is a very much better plan to recommend amputation of the breast in all these cases than to outline any complicated rules by which exceptions to this plan of treatment may be made.

CYSTADENOMATA. In his report of two cases of cystadenomata Keibel[1] takes exception to some of the statements made by Schimmelbusch in his original description of these tumors. In the first place a positive diagnosis cannot be made easily, and often the breast has been amputated as for carcinoma when the tumor proved to be a cystadenoma. In certain cases the axillary glands may be involved and, as in one of Keibel's cases, the tumor may be adherent to the skin. Furthermore, recurrence has been noted. The appearance in the microscopic picture of the signs of an inflammatory process were not observed by Schimmelbusch; Keibel advocates the operative treatment in all cases because of the tendency in a certain percentage of cases, about 10 per cent., to malignant degeneration. With von Bergmann, however, he does not believe it necessary to amputate the breast, for if the tumor recurs a second operation may be performed.

SUSPICIOUS TUMORS OF THE INVOLUTING BREAST. In discussing the attitude of surgeons as to what is the best treatment of a small, doubtful tumor in a woman past the menopause, Stewart[2] takes exception to the views which were expressed by Abbe, in which the latter stated that in 40 per cent. of cases with cystic disease of the breast the tumors were benign in character. Abbe's recommendation to treat these cases by simple puncture and aspiration cannot fail, Stewart says, to do immense harm by justifying the general practitioner in the adoption of a method which must result in fatal delay and dangerous dissemination in all malignant cases so treated. Probably 10 per cent. of the tumors are malignant. Stewart recommends that an exploratory procedure be adopted which would be so executed as to safeguard the patient against any possible dissemination of the malignant growth. The technique of such an exploratory operation might consist in a direct section of the tumor, a procedure which has certain disadvantages, in that during the manipulations the cells of the malignant growth may become disseminated; or amputation of the breast in all cases after the pedicle containing all lymphatics leading to the axilla has been clamped with forceps, *until the tumor has been examined.* In the latter case the incision should be planned so as to permit of a radical operation in case it has been found to be malignant, and as a matter of convenience the breast should be cut loose. In order to prevent infection the pedicle should be divided with the actual cautery or a piece of gauze stitched over the cut end of the axillary pedicle during the remainder of the operation. By this technique the only tissues which by any chance could be infected with cancer are removed after the larger operation is completed. The author concludes by stating: first, there is a lamentable and unnecessary difference of opinion among surgeons as to the treatment of doubtful tumors of the breast; second, all tumors of the breast in patients over forty must be considered malignant until proven benign; third, most of such tumors demand amputation with exploration of the tumor, and a complete Halsted operation if there is then doubt as to benignancy; fourth, an exploratory procedure should be planned to avoid contact of cut lymphatics with any tissues left behind, and any chance of dissemination of cancer cells by pressure before the removal of the breast; fifth, *x*-ray treatment, aspirations, or any but radical treatment are objectionable, as causing delay and dissemination.

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[1] Berliner klin. Wochenschrift, 1904, No. 30.

[2] Journal of the American Medical Association, August 6, 1904.

ANGIOMA OF THE BREAST. In the breast an angioma is a very uncommon tumor. There have been not more than ten authentic cases published; of these one was reported by Malapert and Morichau-Beauchant,[1] occurring in a girl aged twelve. The tumor was noticed fifteen days after birth, but did not commence to grow until she was six months old, since which time the growth has been progressive, but without pain or disturbance of function. In this case the tumor was situated in the right breast beneath the nipple, and had attained to the size of an orange; it was soft, fluctuating, non-encapsulated, and intimately associated with the breast tissue; it was composed of three large cysts and a number of small ones. Certain varieties of angiomata have been recognized, as, for example, the cutaneous, subcutaneous, and intraglandular. They are all of congenital origin and appear at or soon after birth.

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[1] Revue de chirurgie, February, 1904, vol. xxix., No. 2.

The Operation for Mammary Cancer. In discussing this subject Handley[1] calls attention to the fact that it is very much more important to remove a large area of the underlying fascia, and not so important to remove extensive areas of the skin. This opinion of his is based upon the assertion that breast cancer spreads not only in the lymphatics of the pectoral fascia underlying the breast, but through the network of fine lymphatic vessels in the deep fascia in every direction. He has found the channels of the deep fascia lymphatic plexus obstructed even as far as the groin. The subcutaneous nodules which one finds in the skin are not due to primary invasion of the superficial cutaneous lymphatics, but to secondary invasion from the fascial lymphatics. Invasion of the lymphatics of the breast occurs centrifugally, like a water-weed, along a network of irrigation channels, invading the deep fascia in ever-widening circles around the primary growths. It is a significant fact that Watson Cheyne, who has the best published operative results, lays great stress on the removal of a wide area of deep fascia along the lines laid down by Stiles. It should be the operator's aim, therefore, to remove as widely as is practicable a circular area of deep fascia, above, externally, internally, and downward, even as far as to a point three inches below the tip of the ensiform cartilage. Speaking of the skin incision, the latter should fulfil the following conditions: The sutured incision should not form a straight line. If it does the skin tension must be all in one direction—that is, at right angles to the line of the sutured incision; whereas, when the incision is curved or sinuous or triradiate, the pull of the stitches acts in various directions, and the surrounding skin will be dragged in from all the points of the compass and will more easily cover the raw area. The incision should not be parallel with the fibres of the pectoral muscle, and should not lie along the anterior fold of the axilla. In this situation its contraction will tend to bind the arm to the side, and it is along the anterior fold of the axilla, in the line of the lower border of the great pectoral, that a reserve of loose skin is required to allow for abduction of the arm. If possible, therefore, the line of the axillary scar should avoid this situation. Lastly, the incision along the anterior fold of the axilla is in a situation where the patient can readily see and feel it, and the æsthetic factor in the operation should not be neglected, save for good reasons. It is, I believe, possible to devise an incision which, without any sacrifice of safety or convenience, will fulfil the preceding conditions. The incision which he uses may be considered as consisting of three parts: A ring incision, as practised by Mitchell Banks, accurately centred on the growth and surrounding it at a safe distance, slightly tailing off into (1) above and into (2) below. A curvilinear incision for giving access to the axilla. The axilla is opened by turning forward a flap of skin whose base lies along the anterior axillary fold. The axillary incision begins at the lower edge of the great pectoral, close to its insertion. It ends—also at the lower edge of the great pectoral—by joining the annular incision (*a*). It crosses the base of the axilla, and marks out an almost semicircular flap of skin, whose convexity reaches back nearly to the edge of the latissimus dorsi. It affords perfect access to the axilla and good drainage afterward. A linear incision coming off from the lower and inner part of the annular incision and passing downward for about two inches along the linea alba. Its object is to give access for the removal of the deep fascia over the upper part of the abdominal wall. Without it this important step in the operation cannot be properly carried out. It would be most convenient to close the incision in the triradiate form.

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[1] British Medical Journal, October 1, 1904.

FIG. 9.

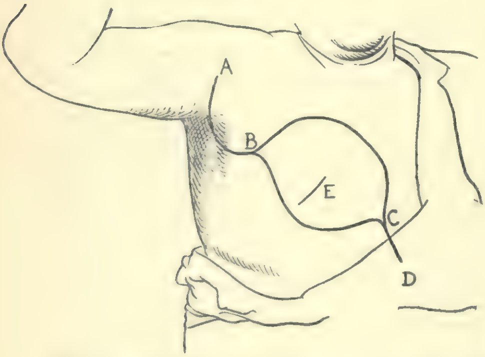

FIG. 10.

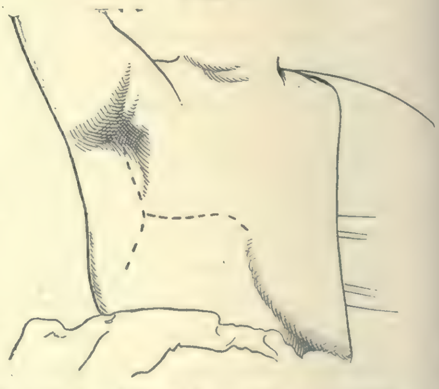

FIG. 9.—Case of mammary carcinoma, adherent to skin and muscle, operated upon at the Samaritan Hospital, January, 1903. A B, axillary flap incision; B C, annular incision circumscribing the growth; C D, incision to allow of removal of epigastric deep fascia. E is a deep pucker in the skin, produced by the contraction of the growth. The epigastric part of the incision C D, though indicated for convenience on this figure, was not actually carried out in this case, since I had not at the time realized its importance. The deep fascia was, however, very widely removed.

FIG. 10.—A recent photograph of the same case, showing the triradiate scar resulting from the incision A B C in Fig. 9. No recurrence has so far taken place (July, 1904). The scar has become freely movable on the thorax, and the pull of the arm has stretched it nearly to the width of an inch. The movements of the arm are practically unimpaired.

Heart. It is gratifying to note, in the perusal of the literature of the past year, a number of contributions upon the surgery of this organ. While the development of this field of surgery dates but a few years back, we should not forget that many years ago Roberts recommended operative intervention for the treatment of traumatic and inflammatory lesions. It was Roberts who proposed that the diseased pericardium should be treated as the pleura in similar pathological conditions. In 1876 he recommended incision and drainage of the pricardium if the fluid contents were purulent. In 1881 he advocated heart suture for wounds of the cardiac wall, and in 1897 devised a formal method of attacking the pericardium and heart by a trap-door resection of the costal cartilages. It has only been of more recent years, however, that the procedures which at one time seemed hazardous are now resorted to without hesitation when the indications present themselves. It may be of interest from the historical point of view to refer to some of the contributions which mark the progress in the development of this field of surgery. In April, 1897, Rehn presented to the Congress at Berlin the first patient who recovered after suture of a wound of the heart. In 1898 Terrier and Reymond presented a monograph on the surgery of the heart and pericardium, which was followed in 1899 by a memoir by Loisson. In 1898 Lannelongue operated successfully upon a case of ectocardia, and at about the same time Baudouin conceived the idea of applying surgical measures to the separation of xiphophage monsters. Later Delorme proposed an operation for the removal of adhesions in pericarditis, and, finally, Tuffier originated massage of the heart as a method of resuscitation in case of syncope.

PARACENTESIS OF THE PERICARDIUM. Roberts[1] reports two cases of paracentesis of the pericardium. In both cases he used the Roberts pericardial trocar. The needle was introduced in the first case in the fourth left interspace, over the apex beat to a depth of about 3½ cm., and three ounces of a very bloody serum were withdrawn. Three days later the pericardial sac seemed to have refilled ; the operation was repeated, and four and a half fluidounces aspirated. Previous to this two other attempts had been made unsuccessfully. The patient died early the following morning; the autopsy showed that the pericardial cavity was nearly free from fluid, and revealed a small ecchymotic area on the surface of the heart, which might have been caused by contact with the trocar. In the second case he introduced the needle in the fourth right interspace close to the sternum, and withdrew three drachms of slightly reddish fluid. He punctured again in the fifth left interspace over the apex beat, and, although the trocar seemed to strike the heart, no fluid escaped. The patient died a few days later, and at the autopsy no fluid was found in the pericardium, and no mark was found or wound of the heart, although this might have been concealed by the deposits of lymph which were found on the heart surface.

DRAINAGE OF THE PERICARDIUM. Pendlebury[2] reported two cases of drainage of the pericardium, one of which died. In operating for exposure of the pericardium the author prefers a vertical incision to one along the lower border of the seventh rib, because it gives access to the sac without interfering unduly with the attachments of the rectus muscle, and because it permits the operator to proceed at once with the removal of the sixth costal cartilage, if this becomes necessary. He divides the triangularis sterni with the intercostal membrane and muscle up to the sixth costal cartilage, pushes aside both the right and left pleura, and, in order to avoid opening the peritoneal cavity, incises the pericardium just above the level of the base of the ensiform cartilage.

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[1] American Journal of the Medical Sciences, September, 1904.

[2] Lancet, October 22, 1904.

TRAUMATIC HÆMOPERICARDIUM. A little girl, two and one-half years old, fell from a windowsill on to a needle. The needle penetrated the chest near the right edge of the sternum, and later worked its way into the pericardium. Two weeks after the accident the patient began to complain of pain in the side, respirations were grunting in character, and physical examination demonstrated the presence of fluid in the pericardium. Morse[1] practised paracentesis and withdrew a considerable quantity of fluid, after which the child was very much relieved and rapidly recovered. He selected the fifth right interspace at the edge of the sternum as the point at which to introduce the needle, believing, with others, that at this point the pericardium can be most safely and most easily reached.

SURGICAL ASPECTS OF PYOPERICARDITIS. Based upon his experience with three cases in which the pericardial sac was opened and drained, Le Conte[2] discusses the surgical aspects of pyopericarditis. No operation should be performed without exploratory puncture being made. From certain observations which he had made upon the cadaver, he concluded that the point of election for paracentesis for exploratory puncture is in the fourth and fifth interspaces, as close to the edge of the sternum as the needle can be made to enter. In this position there is the smallest chance of penetrating the pleura, and the internal mammary vessels should lie well to the outer side of the needle. If no fluid is withdrawn and there is no evidence of penetration of the heart by motion imparted to the needle, the fourth interspace should be tried, and if this also fails to demonstrate the presence of fluid, the same interspace one and a half to two inches from the left border of the sternum should be tried. The only treatment which should be considered in the presence of pyopericarditis is incision and thorough drainage. Paracentesis will at all times relieve temporarily urgent symptoms, and should be employed without hesitation. In the majority of cases the operation should be performed under local anæsthesia, since in the presence of a large collection of fluid the heart action is embarrassed and the administration of a general anæsthetic becomes dangerous. It might be advisable, when the condition of the patient justifies the administration of an anæsthetic, to practise excision of the costal cartilages rather than intercostal incision. The latter, however, is the safer operation of the two, and should be followed in the majority of instances by recovery without further operative intervention. If the pericardium is much distended with pus the overlying pleural cavity is almost certain to be obliterated; so that the incision can be made through it without risk. The point of election for incision is the fourth left interspace, beginning one inch from the sternal border and extending to the normal position of the apex beat of the heart, about one inch internal to the anterior mammary line. When the pericardial sac is opened the pus should be allowed to flow out slowly, so as not to embarrass the heart by the sudden relief of pressure. An intercostal incision produces no shock, is the simplest procedure in grave cases, and permits of a more extensive operation at a later period if found inefficient. The first of the operative cases was one of pneumonia, in which pericarditis was recognized on the thirteenth day. Paracentesis gave immediate but only temporary relief. Intercostal incision was followed by complete convalescence at the end of six weeks. The second case was a case of croupous pneumonia, developing a pericardial effusion on the sixth day. The pericardium was drained through an intercostal incision. Convalescence was uninterrupted. The third case developed a pericarditis secondary to a septic condition of the extremities. This operation was followed also by recovery.

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[1] Boston Medical and Surgical Journal, March 3, 1904.

[2] American Journal of the Medical Sciences, September, 1904.

Mintz[1] operated upon a little child with pyopericarditis, draining the pericardium through an opening made by resecting the fifth costal cartilage. Inasmuch as the opening did not drain the deepest point of the pericardial sac he concluded to make another opening farther down. An incision was made along the lower border of the seventh costal cartilage, and after separating the attachment of the abdominal muscles and diaphragm he exposed the pericardial sac, opened, and drained. This method of approach was suggested almost a century ago by Larrey in the treatment of a patient with a stab wound beneath the seventh rib. Inasmuch as the patient was suffering from evidences of cardiac compression, Larrey dilated the punctured wound and evacuated a large quantity of pericardial fluid. After a number of observations made upon the cadaver, Mintz elaborated the following technique: An incision 7 cm. in length is made along the border of the seventh costal cartilage. The attachment of the abdominal muscles is separated from the under surfaces of the rib, a section of which is removed. The internal mammary artery crosses the wound and should be ligated. With one finger the operator compresses the diaphragm and exposes to view the angle of the pleura, and also, somewhat higher and toward the median line, the pericardial sac. If the latter is opened at this point one is assured of thorough drainage, inasmuch as the opening is made in the most dependent portion.

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[1] Zentralblatt für Chirurgie, 1904, No. 3.

SUTURE OF THE HEART. I have taken pains during the past two years to collect and tabulate all the cases of heart suture recorded in literature. Up to and including 1903[1] my list comprised 60 cases. Since then I have found 2 cases which escaped my notice in 1903 and 11 cases reported in 1904, making a total in all of 73 cases. The following is a brief record of the cases which appeared in various journals during the current year:

Renon's case.[2] The patient shot himself with a revolver, the ball entering the fourth interspace, 4 cm. from the left sternal border. Under chloroform anæsthesia sections of the fourth and fifth ribs were excised, and upon enlarging the pericardial wound a violent hemorrhage followed. The cardiac wound was found at the apex of the left ventricle and closed at first with the finger, then with two catgut sutures. At the conclusion of the operation the patient was in collapse; he died thirty hours after the operation. At the autopsy it was seen that the suture had held perfectly and that there had been no leakage.

Three cases by Orzymowski.[3] The first, a young man between twenty-five and thirty years of age, who received a stab wound of the thorax, which penetrated and caused a wound 2 cm. long in the apex of the heart. The wound was closed with three deep and two superficial sutures. The patient died two days later of pleurisy and purulent pericarditis. The second case, a young man nineteen years of age, who sustained three wounds of the heart, which were closed with silk sutures, and a wound of the pleura. Though the wound and pericardium became infected the patient eventually recovered. In the third case there were two wounds of the heart, but only one of these was discovered at the operation. The patient died two days later and the autopsy revealed a second wound about 2 cm. above the first; the edges of the wound were, however, adherent, and hemorrhage had evidently been arrested. There was also a pleurisy and purulent pericarditis. The author has observed in heart wounds a fuller pulse in the right than in the left radial artery. Smith[4] operated upon a patient with a penetrating wound of the right ventricle thirty minutes after the receipt of the injury. Sections of the fourth and fifth ribs and a portion of the sternum were resected. The cardiac wound was closed with a continuous silk suture, but, inasmuch as bleeding continued, a few more interrupted sutures were introduced. The patient was apparently on the road to recovery, but died suddenly on the seventh day. The wound in the pericardial sac and heart had firmly united, but the heart and left ventricle were covered with a plastic inflammatory exudation. Vogel's[1] patient sustained a penetrating wound involving the anterior wall of the right ventricle, as well as the pleuræ. The wound was exposed by resecting the fourth and fifth costal cartilages and closed with five interrupted silk sutures. The pericardial sac was not drained. Two days later there was evidence of fluid accumulation in the pericardial sac, and the patient became restless and dyspnœic. The pericardium was reopened and a quantity of turbid serum evacuated. Despite this complication the patient recovered. The case which Kappeler[2] reported was of especial interest because it is the first in which recovery has followed a wound of the auricle. While a considerable number of cases have recovered after suture of the ventricles, of the 41 previously reported cases of injuries to the auricles not one has recovered. It is well known that injuries to the auricles are of very much more serious character than injuries to the ventricles. This is due principally to the fact that the wall of the ventricle is very much thicker than the auricle, and that the contractures of the ventricle wall during sẏstole tend to spontaneous closure of the wound. Injuries to the auricles are so extremely dangerous and tend so rapidly to a fatal termination that very rarely have opportunities been offered to apply surgical measures. It should not be forgotten that even in wounds of the auricle immediate death is the exception rather than the rule, so that frequently an opportunity is offered to apply active measures. Three hours after the injury the patient was in a state of collapse, but with no physical signs pointing definitely to a wound of the heart. However, owing to the situation of the wound and the desperate condition of the patient, exploration seemed justifiable. Upon reflecting a flap including the third and fourth ribs toward the sternum a wound of the pleura was discovered 3 cm. long in the third intercostal space, and a wound of the pericardium 1½ cm. long, from which a stream of bright-red blood was expressed. The wound in the pericardium was enlarged and revealed a stab wound of the wall of the auricle about 1 cm. long. With each diastole a small stream of bright-red blood gushed out, while in systole the bleeding ceased. Without any especial difficulty the wound in the auricle was closed with a continuous silk suture, the pericardial sac was thoroughly cleansed, and the wound of the pericardium was closed. During the period of convalescence an empyema developed which required resection of the rib for drainage. The patient, however, eventually recovered. Commenting upon the technique of the operation the author says that the suture of the wound was accomplished without especial difficulties, since the auricle does not make as great "*bewegungsexkur-*

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[1] PROGRESSIVE MEDICINE, March, 1904, p. 118.

[2] Tribune médicale, 1904, No. 3.

[3] Medycyna, 1904, 25–30

[4] Southern California Practitioner, September, 1904.

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[1] Zentralblatt für Chirurgie, 1904, No. 22.

[2] Deutsche Zeitschrift für Chirurgie, Bd. lxxii., Heft 4–6.

sionen" as does the ventricle. The first suture had to be introduced with a free hand, but afterward the wound could be steadied by making traction upon the suture and the introduction of the remaining sutures was extraordinarily easy. In the pericardial sac a great quantity of the blood clot was found, not in the anterior, but in the posterior and inferior portions.

Stewart's[1] case had been stabbed in the chest with a rusty penknife. Under ether anæsthesia the operation was begun about forty-five minutes after the infliction of the injury. Upon resection of the third and fourth ribs he found a wound in the pleura and anterior edge of the left lung and in the anterior wall of the left ventricle. The lung was collapsed and the pleural cavity contained a large quantity of fluid blood. The cardiac wound was closed with a continuous silk suture, and during the introduction of the suture the coronary artery was injured, but hemorrhage from the wound was easily controlled with an additional suture. The pericardial sac and pleural cavity were drained. The patient was discharged from the hospital fifty-six days after the operation.

Schubert's case[2] has a twofold interest, both on account of the recovery of the patient and the peculiar situation of the wound. The injury was a self-inflicted gunshot wound which involved the pleural cavity and lung as well as the heart. The presence of a large hæmothorax was manifest, but there was some doubt about the involvement of the heart. At the operation, however, upon opening the pericardial sac, two wounds, one in the anterior and one in the posterior surface of the heart, were discovered, but from neither of these was the hemorrhage profuse. Both wounds were small and were closed with catgut sutures. The very moderate hemorrhage from the heart wounds Schubert explained on the supposition that the bullet did not enter the cavities of the heart, but simply penetrated the septum, and he made some investigations upon the cadaver which seemed to show that such an occurrence was quite within the range of possibilities. Of the 70 cases of wounds of the heart which have been subjected to operation, but a very small number, probably less than 10, have been due to gunshot wounds. Of these 3 were in the left and 2 in the right ventricle. The fact that relatively so few cases of gunshot wounds of the heart have come to operation is probably due to the fact that in most cases the bullet penetrates the heart and causes two wounds, a wound of entrance and of exit, which will permit of a rapidly fatal hemorrhage, whereas in the case of stab wounds the instrument usually penetrates only the anterior wall, and the character of the wound as compared with a gunshot wound is such as would not allow of as free hemorrhage. Schubert's case recovered without any complication.

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[1] American Journal of the Medical Sciences, September, 1904.

[2] Deutsche Zeitschrift f. Chirurgie, October, 1904, Bd. lxxv., Heft 1.

The tenth case of the series was a stab wound of the left ventricle. Stude[1] exposed the heart by the Rydygier incision and closed the wound with silk suture. Death occurred on the table, while the external wound was being closed.

The eleventh case. A man, with suicidal intent, forced the blade of a penknife between the fifth and sixth ribs at the apex beat. After the knife had remained in this position for half a minute, being surprised and disappointed that he was still alive, he withdrew the knife and reinserted it directly above the first wound, between the fourth and fifth ribs. He left the knife in position and noticed the handle move up and down with each cardiac systole. Not satisfied with this, he rotated it twice. Five minutes later he was, in a state of profound collapse, removed to the hospital and operated upon fifty minutes after the injury. A musculocutaneous flap was reflected, exposing the two wounds. The interspaces were so wide that it was not necessary to resect the ribs. The stab wound in the fourth interspace was enlarged, exposing a wound in the pericardium. This later was lengthened and a wound three-eighths of an inch in length was found in the left ventricle. The aperture of the wound was plugged with some lacerated myocardium. The myocardial wound was closed with three interrupted silk sutures, the pericardial sac cleansed, its wound partially closed, and drainage introduced. The stab wound in the fifth interspace had wounded both the pericardium and pleuræ. The patient reacted promptly and eventually recovered completely from the effects of the injury.

The following is a table of 11 cases not included in the series of 39 cases published in PROGRESSIVE MEDICINE March, 1903, pages 102 and 103, and the table of 21 cases published in PROGRESSIVE MEDICINE March, 1904, pages 118 and 119:

No.	Operator.	Chamber wounded, and size of wound.	Results and remarks.
61.	Renon.	Apex left ventricle; 2 catgut sutures.	Died thirty hours after operation.
62.	Orzymowski.	Apex of heart, wound 2 cm. long; suture.	Died two days later, of pleurisy and purulent pericarditis.
63.	Orzymowski.	3 wounds of heart and wound of pleura; closed with silk sutures.	Recovery.
64.	Orzymowski.	2 stab wounds of heart; 1 found at operation and closed.	Death two days later.
65.	Smith.	Penetrating wound right ventricle; continuous silk suture and interrupted sutures.	Died on seventh day; heart and left ventricle covered with plastic inflammatory exudation.

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[1] Deutsche militärartzliche Zeitschrift, 1904, Heft 1.

No.	Operator.	Chamber wounded, and size of wound.	Results and remarks.
66.	Vogel.	Penetrating wound involving anterior wall of right ventricle, as well as pleuræ; five interrupted silk sutures.	Recovery.
67.	Kappeler.	Stab wound of wall of auricle about 1 cm. long; continuous silk suture.	Recovery.
68.	Stewart.	Wound of anterior wall of left ventricle; suture and drainage of pericardial sac and pleural cavity.	Recovery fifty-six days after operation.
69.	Schubert; operation by C. Lauenstein.	Wound of heart septum between ventricles.	Recovery
70.	Stude.	Wound of left ventricle; silk suture.	Death occurred on table.
71.	———	Wound of left ventricle; silk sutures.	Recovery.

SUMMARY.

	Cases.	Per cent.
Total number of cases	71	
Number of deaths	40	56
Number of recoveries	31	44

	Cases.	Died.	Recovered.	Mortality.	Recovered.
Right ventricle	22	15	7	68	32
Left ventricle	35	16	18	49	51
Right auricle	3	1	2	33⅓	66⅔
Left auricle	0				
Apex	3	2	1	66⅔	33⅓
Coronary artery	1	1	..	100	
Septum between	1	..	1	...	100
Seat of wound not stated	7	5	2	71	29

MASSAGE OF THE HEART. With the exception of Haag's, Starling's, and Inglerud's experiences, the results of massage of the heart upon man have been practically *nil*. Though recovery has ensued in such a small percentage of cases, the interest of the profession in the subject is still keen, and experiments are still being conducted with the hope that further elaboration of the technique or the addition of supplementary measures may enable us to save a greater number of lives. Kemp and Gardner[1] have recently published the results of their experimental researches on resuscitation after death from chloroform. They succeeded in resuscitating 11 out of 23 animals after absolute cessation of the heart action to sight, touch, and compression of the heart, and that too after the heart had remained in that condition for variable periods of time without any efforts at resuscitation. The animals lived from two to twenty-four hours, and in most of them body function returned to normal, and they became active and hard to control. The autopsies demonstrated in some cases that the sutures were torn out, death probably being due to the collapse of the lung or secondary hemorrhage. As a result of their experiments they express the belief that this procedure is both therapeutically sound and perfectly justifiable in all cases of death from chloroform or from any anæsthetic, from drowning or allied conditions, when all other means of resuscitation have failed. Remembering that the return to life may not occur until some time has elapsed, one should persist in attempts at resuscitation for at least an hour to an hour and a half. The technique of the operation which they recommend consists in making an incision over or slightly below the apex, and if necessary resecting a small piece of the fifth and sixth ribs. The animal is placed in Nelaton's position, as this thrusts the heart against the chest and somewhat upward; the index finger is passed over the margin of the heart and behind it near the apex, and pressure is made upon the heart against the chest. While massage of the heart is the most important and the essential factor in attempts at resuscitation, there are other measures which, though supplementary, should be regarded as equally indispensable. As Keen pointed out, it is not the mere stoppage of the heart, but the cessation of other concomitant vital phenomena that are concerned in the processes, and the mere starting of the heart action is not sufficient always to restore the patient. Blood pressure must be restored and the respiratory centres must be stimulated; therefore, in addition to the massage of the heart one should resort to infusion of adrenalin and salt solution and to artificial respiration. The temperature of the normal saline solution, as Dawbarn has demonstrated, should be 120°. At such a temperature the solution may reach the heart at about 110°, which is a little above the temperature of aortic blood (102.5° to 103.5°). Inasmuch as heat, however, is a cardiac stimulant itself, it is important that the saline infusion should be of as high a temperature as one can with safety employ. Artificial respiration may be practised by one method or another, or by the use of Fell-O'Dwyer apparatus. Kemp and Gardner have devised an intubation tube which is practically an O'Dwyer tube with a hollow needle. There is a small opening on the upper surface of the tube which by means of the thumb can be regulated as an expiration valve. This instrument possesses the merit of cheapness and simplicity, and is much less liable than the Fell-O'Dwyer instrument to damage the soft parts. Intubation of the larynx is, in their opinion, the only accurate method of securing artificial respiration. They call attention to a portable pump, constructed in the physiological laboratory of Columbia University, which can be easily regulated and is extremely useful in resuscitation in cases of collapse on the operating table, in drowning, in cases of opium poisoning, and in respiratory failure in the newborn. It is so constructed that it can be run by electricity, gives the proper inspiratory and expiratory pauses, and can be so regulated in power and rapidity as to be adaptable both to small animals and to man.[1]

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[1] New York and Philadelphia Medical Journal, May 14, 1904.

Mention should be made of the experiments of D'Halluin,[2] who suggests the possibility that the heart might be catheterized by way of the jugular vein and the oxygenated venous blood reinjected into an artery, thereby simulating autoinfusion. According to the author the principal cause of failure seems to be a fibrillary trembling under the influence of massage, but this may be obviated by introducing one electrode into the rectum and applying the other to the ventricle after the manner suggested by Batelli. The latter observer noted that when the oxygenated blood entered the coronary arteries the fibrillary tremors began, but they were arrested by turning on a current of 240 volts for a second or two.

Although the operation was performed in 1901 it was not reported by Kemp until this year.[3] The patient, a young girl, had already been subjected to several previous operations and had developed pyæmia. To open some metastatic abscesses nitrous oxide was administered and the operation lasted only about five minutes. The patient was somewhat shocked, but rallied after the use of saline infusion and other appropriate remedies, when she suddenly went into collapse and died almost instantaneously. Massage of the heart was practised, but failed.

In Keen's[4] case the heart was masséed without opening the thorax. Just at the completion of a total laryngectomy under chloroform anæsthesia the circulation suddenly failed. After failing with the usual methods to resuscitate the patient the abdominal cavity was opened, and with one hand on the anterior wall of the chest and one within the abdominal cavity the heart was masséed. This was continued for one-half hour, but without avail. Ingelsrud[5] was more successful. His patient collapsed during the performance of an abdominal hysterectomy. Although the abdominal cavity was already open, the heart was exposed through an osteoplastic flap in the chest wall and massaged directly. The action of the heart was restored promptly and the patient recovered.

Foreign Body Embedded in the Heart. In an autopsy upon a patient seventy-six years of age, who died from inanition, Koch[6] found a piece of steel about 3 cm. long embedded in the wall of the left ventricle. There was nothing in the patient's history to give any clue as to the time at which the accident occurred, nor did it apparently cause any personal discomfort nor any changes in the pericardium.

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[1] Both the pump and intubation tube can be secured at Stohlmann & Pfarre, 107 E. 28th St., New York City.

[2] Presse médicale, 1904, No. 44.

[3] New York and Philadelphia Medical Journal, May 14, 1904.

[4] Therapeutic Gazette, April 15, 1904.

[5] Loc. cit.

[6] Berliner klin. Wochenschrift, July 11, 1904.

CARDIOLYSIS.[1] Von Beck[2] reports 3 cases of chronic adhesive mediastinopericarditis in which the operation recommended by Brauer was performed. In all 3 cases there was a left-sided pleurisy, cyanosis, irregular and rapid heart action, engorged liver, ascites, joint œdema; and in 2 cases albuminuria. In the performance of the operation a wide resection was made of the third, fourth, fifth, and sixth ribs on the left side from the edge of the sternum to the anterior axillary line. In all of the cases operation was followed in a short time by marked relief to the heart and improvement of its action. The secondary congestion of the liver and spleen were relieved and the ascites and albumin disappeared. In one case, a boy of eight years, the cure was so marked that two years after the operation he could indulge in active exercise without embarrassment to his cardiac mechanism. In a second case an extensive empyema was drained by the anterior thorocoplasty, the fistula from which persisted, though the cardiac lesion was relieved. At a later operation seven entire ribs, from the third to the ninth, inclusive, were resected back to the vertebral column (von Beck suggests that the mortality of operations upon empyema might be lowered by a two-stage operation). The lesion for the relief of which this operation was performed was due to a chronic pleurisy with secondary tuberculous peripleuritis and empyema of the mediastinocostal sinus of the cardiac notch of the left lung.

Diaphragm. WOUNDS OF THE CHEST PENETRATING THE DIAPHRAGM. There is no doubt but that surgeons as a class are much more apt to apply palliative measures in the treatment of penetrating wounds of the chest where they would not hesitate to recommend immediate operation if the peritoneal cavity and not the thorax was involved. Both American and English surgeons are very conservative in their treatment of chest wounds. In sharp contrast to them stand the French and Italian surgeons, who advise and practise immediate interference in penetrating wounds of the chest and in wounds below the sixth intercostal space. Williams[3] is an advocate of radicalism, and firmly believes that in the majority of cases penetrating wounds of the chest below the sixth intercostal space demand at least exploration. Probing such wounds is of no value, and digital examination is far less accurate than the resection of a rib whereby actual observation and positive diagnosis can be made and direct treatment instituted. The author has had an unusually large experience in this field of surgery, having had opportunity to examine 26 cases of complicated wounds of the chest involving the diaphragm. Of these the first 10, excepting 1 heart case, died from non-interference. Of the remaining number 2 died within three hours of hemorrhage, 1 from a perforating wound of the heart, 1 from embolism, and 3 from infection. Of the remaining 13, 3 died one year, eighteen months, and twenty months, respectively, after the operation. The remaining 7 are living. He records the history of 3 of these cases in order to show how absolutely impossible it would have been without exploration to have determined the nature of the injury, and how inevitably the patient would have died had not immediate operation been resorted to. One of these sustained not only a perforating wound of the diaphragm, but a serious injury to the left kidney, ureter, and trunk of the renal artery; the wound in the diaphragm was closed and the injured kidney removed. In another case there was a stab wound of the diaphragm involving the spleen. In this case the wound of the diaphragm was closed, the splenic wound sutured, and the patient recovered. In addition to the wound in the diaphragm there was in the third case a penetrating wound of the colon.

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[1] See PROGRESSIVE MEDICINE, March, 1904.

[2] Archiv f. klin. Chirurgie, Bd. lxxiii., Heft 4.

[3] Annals of Surgery, November, 1904.

Rona[1] believes, as Williams does, in the urgent necessity for prompt surgical intervention in this class of injuries. Rona operated upon a boy of fifteen, with a stab wound of the chest from which a considerable portion of the omentum protruded. The operation was performed under local anæsthesia, and the wound in the diaphragm, which was about 4 cm. long, was exposed, and closed by the transthoracic route. The patient made an uninterrupted recovery.

Neugebauer[2] reports a case of diaphragmatic hernia immediately following a stab wound and discusses the condition generally. After drinking three litres of beer the patient became engaged in a quarrel and was stabbed in the left thorax beneath the sixth rib. The patient was admitted to the hospital in a condition of collapse, with dyspnœa and a rapid pulse. There were no breath sounds over the left lung, the chest giving a tympanitic note to percussion. The heart was displaced to the right. Under chloroform narcosis the thoracic wound was enlarged, the hole in the stomach was closed, the organ reposited within the abdomen, and the wound in the diaphragm sutured. A secondary incision at an angle to the first was made along the costal margin and the peritoneum opened. The colon and omentum were inspected, and the gastrohepatic omentum opened to allow inspection of the posterior wall of the stomach. The wounds were then sutured and the pleural cavity drained. The patient recovered. Neugebauer then refers to the debated question as to whether the thoracic or abdominal route should be employed when wounds of the diaphragm are suspected. The indications for operation are usually clear—protrusion of the omentum, the escape of chyme through the wound in the thorax, the appearances of the stomach or intestine in the pleural cavity, or especially bleeding externally or into the pleura. But in those cases in which the intestine or omentum herniate into the pleural cavity, some time after the infliction of the wound, the diagnosis is exceedingly difficult, and death may occur from strangulation of the bowel. He cites the following case as an illustration: A man attempted to commit suicide by shooting. The ball entered the left breast 1 cm. to the right of the nipple; no untoward symptoms occurred except slight emphysema, and in six days the patient left the hospital as recovered. Six months later the man began to suffer from abdominal pain, constipation, and indigestion, and two and a half years after the injury he was operated upon for acute intestinal obstruction, at another hospital, when gangrene of the cæcum and ascending colon was found without apparent cause. He died, and at autopsy the entire splenic flexure and a large part of the omentum occupied the left pleural cavity, compressing the lung, and having pushed through a wound in the diaphragm. Had Neugebauer used the *x*-ray and localized the bullet beneath the diaphragm, an immediate operation would have been performed and the patient's life might have been saved.

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[1] Deutsche med. Wochenschrift, June 9, 1904.

[2] Archiv f. klin. Chirurgie, Bd. lxxiii., Heft 4.

Mortality from immediate operation is low, while that of incarcerated diaphragmatic hernia is extremely high. After wounds of the thorax, probably involving the diaphragm, a thorough exploratory operation should be performed for the same reasons that the abdomen is opened after it has been penetrated by a stab or gunshot wound. In comparing the various methods he finds that of 52 transpleural operations there was a mortality of 9.6 per cent., and of 10 abdominal a mortality of 50 per cent., not including the cases of chronic prolapse, which in itself is an extremely grave condition. When the abdominal route is taken the mortality is higher, because of the increased difficulty and time required to perform the operation and of the chance of overlooking injuries to organs immediately beneath the diaphragm, especially the posterior wall of the stomach. On the other hand, pneumothorax occasionally causes a fatality when the transpleural operation is performed. There need be no dispute as to whether to adopt the pleural or peritoneal route, because whether the condition is a wound, a chronic hernia, or an incarceration, it will often be necessary to open both cavities. If the abdomen is opened for diagnostic purposes, it will be found necessary to open the thorax to suture the diaphragm; if the pleural cavity is first opened, it will usually be necessary to perform a laparotomy to reduce the hernia.

Sarcoma of the Chest Wall. The diagnosis in this case was not confirmed by microscopic examination, but the gross appearance of the tumor was such as to suggest sarcoma, and the tumor was so large that it was regarded as inoperable. March[1] undertook the treatment of the tumor with the x-ray, and after twenty-six applications the tumor entirely disappeared. Already a year has nearly elapsed since the disappearance of the growth and there is no sign of recurrence.

Pleura. THE TREATMENT OF EMPYEMA. Of recent years there has been a growing tendency to perform more radical operations in the treatment of chronic empyema. The subperiosteal resection of a limited portion of one or two ribs will not suffice in the majority of cases to effect a cure. Voswinckel[2] records the results which have been obtained from Körte's clinic at the Urban Hospital in Berlin after extensive resections of the ribs. In most of their cases a U-shaped musculocutaneous flap, with its base above, is reflected, and not only the ribs but the costal pleura and intercostal muscles removed. The treatment of the parietal pleura varies according to individual cases. In those cases in which there are dense vascular adhesions between the lung and pleura, decortication after Delorme is not resorted to. It is sufficient under such circumstances to make, either with the galvanocautery or with a knife, several parallel incisions down to the lung tissue. As to the immediate results of the operation in 13 cases, 9 survived and 4 died. Although a very large portion of the thoracic wall was removed the stability of the affected side suffered but little; in no case was there any noteworthy curvature of the spine. The function of the arm on the operated side was but very little impaired, usually only to the extent that the patients could not lift heavy objects as esaily as they could before the operation. Of the fatal cases, 1, a tuberculous subject, died ten days after the operation; a second, also a tuberculous subject, died of heart-failure; the third of penumonia, and the fourth of sudden respiratory failure.

While Beck[3] is thoroughly in accord with the principles upon which the Schede operation is based, he does not approve of it being carried out as a routine procedure. In his own practice he prefers, before deciding upon the extent of the operation, to make an exploratory incision, resecting a small portion of the rib which lies approximately over the middle of the cavity, and a portion of the costal pleura as well, regardless of the pleural fistula. He then proceeds to inspect the cavity and determine the extent to which rib resection must be practised. He advocates the removal of the costal pleura as recommended by Schede. In his series of cases, 71 per cent. of the cavities were situated posteriorly and required a resection of the scapula. The callous areas of the pulmonary pleura should also be removed. The cavity is packed with iodoform gauze, and subsequently drainage tubes enveloped by iodoform gauze can be substituted. Irrigations he believes are not only rendered unnecessary, but are in fact harmful. Stress is laid upon early gymnastics and pulmonary exercise, for which dumbbells and wind musical instruments are recommended. The principles which apply to the treatment of empyemata in the more common situations apply also to those at the apex of the pleural cavity. The following is a description of the operation which he recommends for abscesses situated in this region: With the arm at right angles, the incision is made close to the lower border of the pectoralis major muscle in a horizontal direction till it ends at the lower part of the anterior margin of the deltoid muscle. The muscles are then dissected back superiorly until the axillary region is free. The vessels and muscles are grasped by strong blunt hooks and pulled upward. Sometimes separation is possible only by the aid of lateral incisions into both pectorales. Thus, the vessels are temporarily put *hors de combat*, and the ribs can be removed according to the indicated principles. If it is very difficult to reach the first rib by means of the pectoroaxillary incision, the clavicle is to be resected temporarily.

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[1] American Journal of the Medical Sciences, June, 1904.

[2] Deutsche Zeitschrift f. Chirurgie, Bd. lxxv., Heft 1.

[3] Annals of Surgery, March, 1904

Bevan reported to the Chicago Surgical Society[1] the results of an extensive Schede operation which he performed upon a patient who had an empyema of eight months' duration. The ribs from the third to the tenth were resected subperiosteally, and, after lifting up the flap with a powerful pair of scissors, he cut away all of the intercostal tissues, including the pleura, which was three-quarters of an inch in thickness. The patient's recovery was uneventful, and, with the aid of pulmonary gymnastics, the cavity was altogether obliterated.

The attitude of the profession toward the Fowler or Delorme operation, so-called decortication of the lung, is one of conservatism. It certainly is not carried out as a routine procedure, and is not approved of unless as a measure supplemental to costal resection. It adds considerably to the gravity of the operation, both on account of the additional time which it takes to complete the operation and also on account of the additional hemorrhage.

THE LUNGS.

The Treatment of Pulmonary Fistula. Discussing the operative treatment of bronchial fistulæ which arise from the evacuation of suppurating cavities and hydatid cysts of the lung, Garre[2] points out the various methods that may be adopted according to the nature of the case. In those cases in which the canal is short and not surrounded by dense cicatricial tissue, the closure of the fistula may be effected by application of the actual cautery. In many cases, however, this method will not be effectual, and under such circumstances one or the other of the following procedures may be adopted: When obliteration of the tract is interfered with by the presence of a thickened and indurated pleura, the latter should be excised; when there are adhesions of the pulmonary pleura to the margins of the external opening, these should be removed; and when the walls of the fistula are adherent to the overlying rib, more or less of the latter must be resected. The danger of opening up communications with bronchial branches by the use of a sharp curette is emphasized. Very free excision of the ribs should be avoided whenever possible, especially in the young. Atelectasis and shrinkage of the lung may be prevented if the operation for closure of the fistula is undertaken soon enough. In case of atelectasis associated with a bronchial fistula, decortication of the lung seems to be more appropriate than resection of the thoracic wall.

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[1] Medical News, July 3, 1904.

[2] Deutsche med. Wochenschrift, 1904, No. 15.

Lung. Koenig, in an article which he contributed last year, maintained that it was not advisable, in severe injuries of the lung associated with hæmothorax which developed shortly after the injury, to resort to surgical intervention. More recently Grunert[1] takes a more radical view of the situation, in favor of which he cites a number of cases which came under his own observation. One of these cases was especially interesting in that he was able to expose a lacerated wound on the surface of the lung, which was bleeding profusely, and arrest the hemorrhage by closing the wound with catgut sutures. By this prompt and radical measure the patient's life was no doubt saved. The following are his views regarding the treatment of penetrating wounds of the thorax: A large proportion of gunshot wounds of the lung recover spontaneously, but he believes that a large number of patients whose lives would otherwise be lost can be saved by immediate operation, and that not only will lives be saved by prompt intervention, but such complications as suppuration and secondary hemorrhages will be prevented. With reference to gunshot or bullet wounds, he is in accord with the views expressed by Koenig, namely, that in cases of slowly developing hemorrhage, which are followed in the course of twenty-four to forty-eight hours with a gradual filling up of the thoracic cavity, the plan of treatment should be expectant. After a few days a thoracotomy may be performed for the removal of the blood clot. In cases of penetrating wounds where a larger vessel has been injured the physician in most cases arrives too late. But if the case should be seen in time, recourse should be had to immediate operation, which should consist in a thoracotomy and an attempt to arrest the hemorrhage either by ligatures, sutures, or tampon. In case of emphysema, especially at the onset, he would recommend an immediate opening of the thorax. In stab wounds the treatment should be prompt and energetic, since in these cases emphysema, which soon becomes alarming, develops more easily. Finally, in those cases of stab wounds in which the lung has been injured, a thoracotomy should be performed and hemorrhage arrested by finding the bleeding point and closing the wound with sutures.

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[1] Deutsche Zeitschrift f. Chirurgie, Bd. lxxii., Heft 1–3.

Traumatic Chylothorax. Very few cases of traumatic chylothorax have been observed. Hahn[1] has only been able to collect nine cases altogether, one of which came under his own observation. The patient, thirty-nine years of age, shot himself in the thorax, the wound of entrance being between the sixth and seventh interspace, on a level with the tip of the xyphoid process. The patient developed the symptoms of respiratory distress, with intense dyspnœa. These were relieved by aspiration, which had to be repeated several times. In the course of thirty-one days twenty-seven litres of a chylous fluid were withdrawn. At no time was the temperature above normal, and during the period at which the tapping was necessary the temperature was subnormal. The patient eventually recovered, although his weight fell from one hundred and sixty to one hundred and twenty-eight pounds during the first fourteen days of his illness. From the history of the case the author believes that the bullet did not lacerate the wall of the duct immediately, otherwise the chyle would have collected in the pleural cavity much more quickly, but that in all probability as a result of a severe contusion the wall of the duct underwent secondary necrosis.

The result of his case shows that even in grave cases recovery can ensue by such simple therapeutic measures. One should bear in mind that aspiration should be repeated as infrequently as possible, or that the interval should be as long as possible; a better opportunity will thus be afforded for the injury to the duct to be repaired. Whenever the fluid is withdrawn a negative pressure within the cavity is created, so that the wound, though temporarily repaired, may be forced open by the suction created by the negative pressure. The suggestion has been made, and on more than one occasion put into practice, that in those cases in which the reaccumulation of fluid is rapid, and in which therefore aspiration would have to be repeated frequently, it would be better practice to perform a thoracotomy with resection of the ribs, since in so doing the negative pressure would be abolished. The author gives a *résumé* of the history of eight other cases of chylothorax which he has been able to collect.

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[1] Deutsche Zeitschrift f. Chirurgie, Bd. lxxiii., Heft 4–6.

Thoracotomy in Sauerbruch's Pneumatic Chamber. The investigations of Sauerbruch in connection with the construction of the pneumatic chamber were made at the suggestion of Mikulicz,[1] and may be said to be the most sensational contribution of the year to the surgery of the lung. Since the introduction of antisepsis and later asepsis, the advance of surgery has been rapid and progressive, so that to-day there is scarcely a region of the human system that is not approached and explored. To this general statement, however, there is but one marked exception, and that is the surgery of the thorax. The diffculties and dangers which have attended these operations are well known and have stood as a barrier to advances in this particular field. Every broad opening of the thoracic cavity causes a pneumothorax. There is within the thorax a negative pressure of about 7 mm. of Hg., which on inspiration is not increased, nor even in ordinary expiration; only by forced expiration, as by coughing, is the negative pressure converted into a transitory positive pressure. So soon, therefore, as the thoracic cavity is opened the air rushes in and under the effect of the atmospheric pressure causes collapse of the lung, and at the same time the arrest of its function. This disturbance of function is due not only to the collapse of the lung, but to the fact that pressure is exaggerated both upon the heart and the opposite lung. The technique of every operation on the thoracic cavity whch has been practised to-day strives to prevent the development of pneumothorax. To a less degree is there danger of pneumothorax in empyema operations, but the opening of a pulmonary abscess may be a very serious procedure if the parietal and visceral pleuræ are not adherent to each other. The operation for suture of the heart is very much less dangerous on account of the heart lesion than because of the pneumothorax, which is caused either by the injury or by the operative manipulations. Most of the fatal results in heart suture have been attributed to this complication. Still more difficult are operative procedures upon the œsophagus. No matter from what side the thoracic portion of the œsophagus is approached, the opening of the pleural cavity cannot be avoided. For this reason thoracic œsophagotomy, both in man and animals, has been inevitably fatal.

Attempts have been made to avoid the dangers of the pneumothorax by producing artificial respiration through an intubation tube. This method, however, is not unattended with dangers.

It was in October of 1903 that Mikulicz[2] assigned to Sauerbruch the task of surmounting these difficulties, and as a result of Sauerbruch's labors a pneumatic chamber was constructed in which a constant negative pressure could be maintained. The chamber is airtight, covered with a glass top, and sufficiently large to contain an operating table and two seats for the operator and assistant. In one wall is a circular opening provided with a rubber cuff through which the animal's head projects. On another side is a ventilating apparatus, consisting of a valve and a suction pump run by an electric motor. The latter pumps twenty-eight litres of air in the minute, and the pressure is controlled by a mercury manometer. The ventilation is perfect, and Sauerbruch has remained for two hours in the chamber without experiencing any discomfort. After fastening the experiment animal to the table with the head projecting through the circular opening to the outside, the operator and assistant enter and close the chamber. The suction pump exhausts the air until a negative pressure of 10 mm. Hg. is attained. When the operation was begun it was found that the thorax could be opened on both sides, and that all of the ribs and sternum could be removed, leaving merely small stumps, without interfering with the normal respirations of the animals. Seventy-eight animals were operated upon in the chamber, not one of which was lost during the performance of the operation.

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[1] Deutsche med. Wochenschrift, 1904, No. 15.

[2] Archiv f. klin. Chirurgie, Bd. lxxiii., Heft 4.

Among the operations which may be rendered safer or possible by the use of the pneumatic chamber may be considered extensive resection of the ribs for tumors of the thoracic wall, operations for wounds of the diaphragm; perhaps operations for lesions of the vertebræ where it is desired to attack the anterior surface of the vertebræ, as, for example, in tuberculous spondylitis associated with compression myelitis. The whole field of surgery of the lung may be opened up to us by the introduction of this new appliance. The possibility of removing circumscribed sections of diseased tissue may be near realization. Sutures of the heart may be undertaken with much less concern, and it may even be possible to deliberately open the cavity of the heart for the correction of valvular lesions. The mediastinum may be opened for the removal of malignant tumors, and, above all, the thoracic portion of the œsophagus becomes accessible.

INFECTIOUS DISEASES, INCLUDING ACUTE RHEUMATISM, CROUPOUS PNEUMONIA, AND INFLUENZA.

By ROBERT B. PREBLE, A.B., M.D.

The work of the past year upon infectious diseases is a striking example of the tendency of men to concentrate their thoughts along certain lines to the almost complete exclusion of other things, and this too without any collusion. Some subjects which have previously received but little or only sporadic attention have been repeatedly discussed, while others which even so recently as last year were the subject of numerous contributions have been almost completely neglected. For example, the effects of certain acute infections upon the heart and circulatory apparatus, particularly the effects of typhoid, scarlet fever, diphtheria, and tuberculosis, have been carefully considered and important new facts have been outlined. Certain other diseases have been almost completely neglected. Tetanus, which last year was repeatedly considered, has been scarcely mentioned and no really important addition to our knowledge has been made. There is marked only a growing tendency to introduce the antitoxins into direct contact with the nervous tissue, either by intraneural or intraspinal injections.

The importance of insects of various sorts—flies, mosquitoes, and ticks—in the diffusion of the infectious diseases seems to be very generally accepted and practically nothing of importance has been added. The etiological relation of the trypanosoma to the sleeping sickness is now accepted as a fact, and its transmission through the bite of the tsetse-fly is admitted. Far more important, from our personal point of view, is the now practically universal acceptance of the work done by the Americans in Havana upon yellow fever. The importance of the *Stegomyia fasciata* in the diffusion of this disease has been accepted by both the French and German commissioners appointed by their respective governments to study this question. One occasionally hears a voice in protest of this position, but the evidence is now so strong that we may accept the question as settled, and because of the brilliant results obtained by the health authorities in many communities from work directed along this line, we need no longer fear this disease as an epidemic. The relation of the mosquito to malaria is now universally accepted and forms a basis for work which is greatly reducing the frequency of this disease in portions of the world where it has always caused a major portion of human ills.

No subject has been more frequently discussed during the year than tuberculosis, but no real advance in knowledge can be recorded. In fact, much of the discussion has consisted of assertion and denial. The unity and duality of the human and bovine tuberculosis are still argued, and each party presents evidence in favor of its opinion. No marked advance in therapy has been made, but appreciation of the importance of methods of prevention has grown and many fruitful efforts have been made to educate the general public to the important, the most important, part which it must take in stamping out this universal scourge. The confidence of the profession in the dietetic and hygienic treatment has grown, and their employment may be now characterized as universal.

Typhoid fever has been very generally discussed and certain of its complications, notably intestinal perforation, have been the subject of many extensive articles. Truer appreciation of the value of the Widal reaction is being gained from wider experience, and the Ficker and other modifications of the test, made with the idea of simplifying it and rendering it more adaptable to the practitioner who does not have easy access to a laboratory, have proven to be reliable. The great significance of the low leukocyte count in the early diagnosis of this disease is pointed out in several articles.

Pneumonia has received a great deal of attention, more than would be its share were it not for the growing importance of this disease. Its elevation to the top of the list of destructive infections has to a certain degree concentrated attention upon it. Numerous contributions have been made to our knowledge of its complications, and the profession is beginning to more fully realize the fact that the pneumococcus is capable of causing many other clinical pictures than that of the classical pneumonia. It is greatly to be regretted that no actual progress has been made toward its prevention or more successful treatment. Some new drugs have been added to the already long list of specifics, which do not, however, stand the test. Potassium iodide, which years ago had its day, has reappeared as a candidate, but there seems no reason for the hope that it will prove any more efficient now than it did years ago when Semmola and Ferrara advocated it. In a general way the articles upon treatment have been more sane. There is an encouraging effort made to treat the patient rather than the disease, to intelligently individualize and to assume an attitude of "watchful expectancy," ready to help when help can be given, and to leave the patient alone when the value of our efforts is questionable. A number of the articles insist strongly upon the point of securing for the patient proper rest. The necessity of this seems too obvious for discussion, and yet that it has been so frequently mentioned of late indicates that others, like myself, have found frequent reason for rescuing the patient from the too active attention of the doctor and nurse.

The evidence in favor of the infectious nature of acute articular rheumatism increases, and it becomes more and more probable that the micrococcus of Triboulet and Wasserman is the actual cause of this disease. The work of Walker and Ryffel, of which rather complete details were given in the last number of PROGRESSIVE MEDICINE, has been in part confirmed. Curiously enough this work has received but little attention in America and almost nothing has been done in this country in the way of study of this disease. This is certainly not from lack of material, and it is to be hoped that the coming year will bring forward more work upon the subject.

During the past year measles, one of the most important although not one of the most fatal of the infectious diseases of children, has scarcely been mentioned. It was pointed out last year that this disease was not receiving the attention it deserves, and this year has shown no increase in its study.

Epidemic meningitis has not been common during the year except in New York, but there has appeared several articles on the treatment which promise much and are along new lines, namely, the direct application of antiseptics to the spinal canal.

Serum Diagnosis of Infections increases in importance and has been well considered by Rosenberger,[1] who made an extensive review of the literature relating to this subject. Those who are interested in the history of this most important diagnostic aid and in the evolution of the technique are referred to the whole article. We shall include here only a summary of the results.

TYPHOID FEVER. The agglutinating reaction may be wanting throughout the entire course of the disease, and as this may be due to too high dilution, low dilutions should be tried. Only in a minority of the cases does the reaction appear during the first week; oftenest it is in the second week, but it may be delayed even longer. Libman obtained a positive reaction in 127 of 165 cases of typhoid, and holds that in making the test dilutions 1:20 and 1:50 should be employed. Cabot collated 5978 cases of typhoid in which 97.2 per cent. gave the reaction, while in 5668 control cases only 5 per cent. gave it. Gwyn and Block found it in 144 of 151 cases; Stengel and Kneass in 2283 of 2392 cases.

Adams found it in 50 of 70 cases, and once as early as the third day. Billings, in 1908 blood examinations of suspected typhoid, obtained the reaction in 304, and 111 cases were considered to be typhoid, although there was no Widal reaction. In 131 in which the reaction was doubtful and in 1362 in which it was negative, the cases proved not to be typhoid. The persistence of the reaction has been studied by Browne and Crompton. They state that Widal found 11 of 40 cases showing the reaction long after convalescence. One reacted eight and a half years after with a dilution of 1:18,000. They examined 68 cases from one to forty-eight months after typhoid, and only 3 gave the reaction in dilutions of 1:20 and 1:50—a marked difference from the results recorded by Widal. Stern and Klower obtained a positive Widal in 25 of 100 persons ill with other diseases than typhoid, but in only 3 of these was the dilution over 1:20 and none over 1:40.

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[1] American Medicine, 1904, i., 621.

PNEUMOCOCCUS. Rosenow obtained agglutination of the pneumococcus in 77 of 83 cases of pneumonia. The power of agglutination appears early and remains to the onset of the crisis. After the crisis it shows a rapid diminution. It has been suggested that this reaction might be employed as a diagnostic aid in obscure cases of pneumonia. This peculiarity of the serum was employed by Dieulafoy and other French writers for this very purpose some years ago.

TUBERCULOSIS. The agglutination of the tubercle bacilli as an aid to diagnosis was discussed in the last article on infectious diseases, and Rosenberger in his article adds nothing new.

DYSENTERY. Wollstein found the Shiga bacillus in 39 out of 114 cases of summer diarrhœa in infants. The organism reacted in 21 cases to Flexner's Manila serum in dilutions of 1:50 up to 1:3000, while the Shiga serum gave agglutination up to 1:200. The reaction was uncertain during the first week, and may be absent for two weeks. The test is therefore useless for early diagnosis. Rosenthal in 30 cases found that the reaction could not be expected during the first weeks.

Duval and Bassett in 43 cases of summer diarrhœa isolated the dysentery bacillus, and this organism was agglutinated by the serum of the patients from whom it was obtained.

Park and Dunham obtained positive agglutinations in 12 of 22 cases. Pilsbury draws the following conclusions from a study of 114 cases of disease other than dysentery: 1. That the serum of non-dysenteric adult patients does agglutinate the Shiga and acid type (Flexner) bacilli frequently in dilutions of 1:20 and occasionally in a dilution as high as 1:100. 2. That this agglutinating power is wanting in the blood of non-dysenteric young infants, rarely being present even in a 1:10 dilution. 3. That there are certain differences in agglutinating capability between the Shiga and acid type bacilli, the former clumping more readily than the latter. 4. That a decided and prompt reaction, under two hours, with bacillus dysenteriæ in dilutions of 1:20 or higher in young subjects (under one year) and 1:50 or higher in older persons, who have not recently suffered from chronic or subacute intestinal disease, is probably pathognomonic of acute epidemic dysentery.

PARATYPHOID. The serum of some 42 cases of paratyphoid have been tested by various authors in regard to the agglutination of the paratyphoid bacillus and in 40 cases this reaction was positive.

COLON BACILLUS. Le Sage found the bacillus coli communis in 40 out of 50 cases of enteritis in infants, and the blood of all these cases caused its agglutination. Johnson and Goodall studied the agglutinating power of the blood over the colon bacillus in 25 cases of insanity, and found good agglutination in 4 of 5 cases of melancholia; 1 of 3 cases of general paresis; 1 of 2 cases of delusional insanity. Partial agglutination occurred in 6 of 11 cases of acute mania; 1 of 2 cases of delusional insanity; 1 of alcoholic insanity. No agglutination occurred in 5 cases of mania; 1 each of melancholia, puerperal insanity, and recurrent mania, and in 2 of general paralysis. The agglutination was, therefore, present in 60 per cent. of all cases.

Agglutination tests with varying results have been applied to the streptococci, staphylococci, plague bacillus, the micrococcus of Malta fever, influenza bacillus, gonococcus, bacillus icteroides, bacillus of leprosy, diphtheria bacillus, bacillus of tetanus, proteus vulgaris, oidium albicans, and cholera. In all of these agglutination has been observed, but in no case has the reaction been employed clinically.

Arteriosclerosis Due to Acute Infections. The subject of arteriosclerosis is not a new one, but it is only recently that the suggestion has been made that the acute infections might have some bearing upon the obscure etiology of this most important process. The relation of various chronic infections, notably syphilis, to it is generally admitted, but that an acute process like a typhoid fever may have a bearing upon a very chronic process like arteriosclerosis is a new thought.

The fact that other chronic processes have been referred to such briefly acting causes, for example, the suggestion of various French authors that scarlet fever is an important factor in the causation of hepatic cirrhosis, prepares one for this idea. The subject is carefully taken up by Thayer and Brush. These authors,[1] in a symposium upon arteriosclerosis before the Medical Section of the American Medical Association, contributed an article upon the relation of acute infections to arteriosclerosis. This is only one of a number of articles which have appeared during the year treating of the effects of the acute infections upon the circulatory apparatus, particularly upon the heart. In view of the immense importance of vascular changes, an importance which is by no means so generally appreciated as it should be, any article which throws light upon the causation of these changes deserves attention. The article contains a mass of detail which cannot be quoted here, but as a result of the study of 4000 patients entering consecutively the medical wards at Johns Hopkins these conclusions are drawn:

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[1] Journal of the American Medical Association, February 27, 1904.

1. The percentage of palpable radial-arteries is materially higher among those individuals in whom there is a history of heavy physical labor and of the use of alcoholic stimulants than in the remaining cases. This percentage is appreciably higher in cases giving a history of heavy work.

2. The percentage of palpable radial arteries is higher among those cases presenting a history of severe infectious diseases than among those in which this history is absent, or among those in which a history of no causal factor could be obtained. The proportion is, however, far below that in the case of work or alcohol.

3. Rheumatism appears to be an acute infection, after which the percentage of palpable vessels is highest, and, next to rheumatism, typhoid fever.

There remains much work, both in the way of confirmation and extension, to be done along this line, and it is to be hoped that now that Thayer and Brush have given an impetus to the work, they and others will continue it to some definite and useful conclusion.

Dengue. Last year I had occasion to refer to an able piece of work by Graham, of Beyrouth, upon this disease, by which he appeared to have demonstrated the causal organism and its transmission by the bite of the culex fatigans. It is to be regretted that the year has brought no report upon this subject. Those who have an opportunity to study this disease, an important and serious one in many communities, should take up this work, for a confirmation of Graham's results opens up definite and effective means of stamping out the disease.

Diphtheria. One may infer, from the fact that there has been a marked decrease in the number of papers upon the use of the antitoxin in this disease, that most authors now regard this question as definitely settled, and that therefore it no longer warrants lengthy consideration. This is true, and yet it is important that reports of results should be added from time to time.

No one who has much to do with this disease can have failed to note the changing ideas of the layman in regard to it. During the preantitoxin days it was justly regarded as a most terrible disease, and one against which the medical profession was practically powerless. A diagnosis of diphtheria carried with it an implication of an unfavorable prognosis. The now nearly ten years of increasing employment of the antitoxin has shown the layman that the disease is conquered, and they are already beginning to forget that, left uncontrolled or carelessly handled, the disease will be as terrible as of old. Because they no longer see whole families devastated by it, they forget that such things ever happened, and they are getting into the same careless attitude in regard to diphtheria that so many now assume toward smallpox. It is conceivable that in the future we may have antiantitoxin organizations just as to-day we have antivaccination societies, and that they will employ the same illogicalities to prove their standpoint.

IMMUNIZATION. Although the protective value of injections of the diphtheria antitoxin is now so well established and generally accepted that anything upon the subject may seem superfluous, the report of Zuppinger from the Rudolph Children's Hospital in Vienna seems worthy of some comment. In an early number of the current volume of the *Wiener klinische Wochenschrift* is a report upon their first 1000 immunizations. Their cases were from the youngest sucklings up to fourteen years. At first they, as most others, omitted the immunization of very young babies, but, like all others, came to include them. At first doses of 300 to 500 units were employed, but now for several years only 200 units have been used without any appreciable change in the results. They sound a warning against the use of such small doses as 50 units in very small children. In view of the perfect harmlessness of the antitoxin there can be no excuse for using such a small dose as 50 units, and personally I believe such doses useless. In the 1000 children immunized only 18 were sick during the first three to four weeks. Of these 18, 4 were taken sick the first day after the immunization, 4 the second, and 3 the third—*i. e.*, 11 were taken sick so shortly that it is reasonable to suppose that they were already infected at the time the injection was made. This means that the immunization fails in but 0.7 per cent. Of these 7 cases 1 was taken sick on the fourth, 2 on the ninth, 2 on the twelfth, 1 on the sixteenth, and 1 on the twenty-first day. In all the 18 cases the diphtheria ran a very mild course.

Of the 982 children which did not become sick within four weeks after the immunization, 9 showed a diphtheria later, 1 each after thirty, thirty-three, and thirty-five days, two and a half, three, three and a half, four, five, and eleven months.

In the hospital they followed one routine which appeals to me as an excellent practice. They give all children entering the hospital with measles or scarlet fever an immunizing dose of the diphtheria antitoxin. They do this because they have observed the frequency with which these diseases are followed by diphtheria. They draw attention also to the statement of Melenfeld that the mortality of scarlet fever fell 10 per cent. as soon as the immunization against diphtheria was made a routine practice.

Zuppinger quotes the reports of the value of the diphtheria immunization from different countries, giving the percentage of successes as follows: Holland, 98 to 99 per cent.; Italy, 98.2 per cent.; Hungary, 98.45 per cent.; Bosnia, 98.38 per cent.; France, 97.57 per cent.; Germany, 96 per cent.; Norway, 98 per cent.; Russia, 97.9 per cent.; England and the United States, 99.1 per cent. The conclusions and rules of conduct to be drawn from this report, including not only a local experience of 1000 cases, but also a report of the experience from practically all the civilized world, are so obvious that no comment seems necessary, and yet I personally see so many cases where, for one reason or another, the immunization of children exposed to diphtheria has been neglected, that I must add my voice in favor of the immunization as a routine measure to which there should be no exceptions. The commonest error is to omit the injection in the very young and in those who, rightly or wrongly, are thought to be weaklings. Yet it is just these cases which need the immunization most. They are least resistant and, once infected, have the least power of building their own antitoxin. The reason for omitting the injection in these cases is the erroneous idea that the injection has some injurious effect. This is altogether wrong, for the antitoxin is harmless, and this cannot be too fully dwelt upon. In a personal experience, covering now several thousand injections, I have never yet seen harm result, for I do not consider the urticaria from which some patients suffer a matter of any consequence whatever. The marvellous benefits of the antitoxin treatment and its practically universal success in preventing infection after exposure cannot be questioned by anyone who has had experience with it.

DIAGNOSIS. A paper by R. R. Campbell[1] upon the differential diagnosis between *pseudomembranous angina of syphilis* and *diphtheritic angina* attracts my attention because I have several times seen syphilitic throats mistaken for diphtheria. This is a far less serious mistake than the opposite one, of which Campbell quotes several examples. One cannot but agree fully with his general conclusion that these two conditions may so closely resemble each other that they can be differentiated by culture methods only, and that when any suspicion exists that the case is one of diphtheria the antitoxin should be used promptly while waiting the maturity of our culture tests.

McMahon[2] has an article upon the uncertainties of the diagnosis and the necessity of early and vigorous treatment of diphtheria which may well be quoted, not because it contains any new data, but because it places effective stress upon certain points:

1. Always examine the throat of a sick child, no matter what the symptoms are. To this might be added the caution to examine the nose

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[1] Journal of the American Medical Association, 1904, ii., 1549

[2] Canadian Practitioner and Review, 1904, p. 421.

also and make a culture in all cases of coryza which appear to be sicker than a simple nasal infection should make them. My observation is that a considerable number of the cases which do not receive antitoxin until the fourth or fifth day of their illness are cases in which the diphtheria began in the nose and later extended into the pharynx.

2. Do not trust to the old-fashioned, often wrongly spoken of as the simpler methods, because the diagnosis of diphtheria is doubtful. Whenever there is any reasonable grounds for suspecting diphtheria, use the antitoxin at once, and use enough. Too much can do no harm; too little will.

3. Immunize all children exposed to contagion.

4. Do not delay about using the antitoxin. "Do it now."

This points out the two most frequent mistakes in the treatment of this disease, delay and insufficient dosage. If the diagnosis of diphtheria is a reasonable suspicion, inject the patient at once, and if you are in doubt whether 2000 or 4000 units should be given, give the 4000.

Louis Fischer[1] reports a study of the condition of the upper air passages before and after *intubation of the larynx* for diphtheria. The article contains much that is important and interesting, but contains some teachings which appear to me to be wrong enough to warrant discussion. His methods are, I believe, the cause for the frequency with which he sees chronic stenosis of the larynx following the intubation and requiring the prolonged use of the tube. It was indeed this statement which struck me particularly, and it did so because my experience has been so different. In hunting for an explanation of this difference in experience one notes that Fischer usually employs from 2000 to 3000 units of antitoxin, and that the shortest time the tube is left in the larynx is four and a half days, while the average in 23 cases was nine and a half days. Here is the cause of Fischer's troubles, and if anything is a trouble it is a case of chronic stenosis requiring the prolonged use of the intubation tube. Experience leads me to the opinion that the primary dose of antitoxin in *all* cases of *laryngeal diphtheria* should be at least 10,000 units, and that this dose should be repeated every twelve to eighteen hours if the symptoms remain unchanged or get worse.

If the laryngeal stenosis is sufficient to cause marked dyspnœa the tube should be inserted. The insertion of the tube is far more frequently delayed too long than made too early. The tube should not be left longer than seventy-two hours, and I am becoming more and more inclined to the belief that forty-eight hours are nearer right. Once in a while the tube must be reinserted if removed thus early, but this is very exceptional. If, however, the tube is allowed to remain four days reinsertion is often required, and the longer the tube is left the more frequently trouble results.

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[1] Archives of Pediatrics, 1904, p. 101.

My idea is that within forty-eight to seventy-two hours after the administration of the antitoxin the exudate in the larynx is so softened that much of it can be coughed up, thus enlarging the opening in the larynx sufficiently to render the tube unnecessary. If the tube is left longer it changes the nutrition of tissues pressed upon by it sufficiently to make them liable to œdema or to cause actual necrosis, requiring for their relief the prolonged use of the tube.

Fischer also points out the fact that the indications for intubation in hospital and private practice are very different. Many cases which, in a hospital, where intubation can be done at any moment, might run their course without the operation, require immediate operation in a home. This is one of several reasons why cases of this character should, when possible, be transferred to a hospital. Another and equally cogent reason is that the removal of the tube may be as urgently and as suddenly demanded as the insertion. This can be done promptly in a hospital, while a fatal delay may be unavoidable if the case is kept at home.

HEART COMPLICATIONS. The importance of the cardiac complications and dangers in diphtheria has been for years fully appreciated by the profession, and while considerable space was given to this subject last year, both in its pathological and clinical aspects, the matter is of sufficient weight to quote rather fully an article by White and Smith.[1] They make a report upon a study of 946 cases of diphtheria treated at the Boston City Hospital, South Department, during one year. While including some other data of interest, the main attention is given to the heart complications. The great bulk of the cases, 70 per cent. of them, were less than ten years old, and the influence of age upon mortality is clearly shown in the following table:

	Cases.	Deaths.	Per cent.
1 year and under	57	19	33
1 to 5 years	331	43	13
5 to 10 years	248	20	8
10 to 16 years	109	6	5
Over 16 years	201	6	3

About one-half of the 132 fatal cases died of bronchopneumonia, usually following intubation or tracheotomy; about one-fourth died of heart complications, and the majority of the remaining quarter died of early severe toxæmia, a few of asphyxia or late paralysis. At least two-thirds of the severe and fatal cases averaged four, five, or more days without treatment with antitoxin.

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[1] Boston Medical and Surgical Journal, 1904, p. 433

Physical signs of cardiac disturbance, such as murmurs, rapid and irregular pulse, were common, but symptoms such as dyspnœa, dropsy, cyanosis were unusual. The relation of maximum pulse rate and mortality is shown in the following table:

Pulse rate.	Cases.	Deaths.	Per cent.
100 or under	127	4	3
100 to 120	114	11	9
120 to 140	378	19	5
140 to 160	226	33	14
Over 160	96	49	50

About 65 per cent. of the cases had a maximum pulse rate of less than 140 and showed a mortality rate of 5 per cent. In estimating the prognostic significance of the maximum pulse rate, due allowance must be made for the age of the individual.

Irregularity of the Pulse. This was noted in nearly 60 per cent. of the cases, but was probably present at some time in a larger number. In most cases it appeared one to two weeks after entrance, and in about 35 per cent. of the cases persisted at the time of discharge. In some cases there were periods of varying length during which the pulse was alternatingly regular and irregular, others in which the pulse was constantly irregular. With improvement in the condition of the patient the periods of regularity became longer, the pulse often being irregular only under the influence of excitement or exertion. Patients between the ages of five and sixteen more frequently showed an irregular pulse than either those younger or older. Irregular rhythm was most frequently observed in severe and fatal cases, but Romberg's statement, that an irregular pulse is in general a sign of great weakness and approaching death, is certainly not true.

One of the most surprising items in this report by White and Smith is the frequency with which cardiac murmurs were found, in no less than 94 per cent. of the cases. All of the murmurs were systolic in time except those in a few cases of chronic heart disease. In 90 per cent. of these cases the murmur was found at the time of entrance, and developed within one or two weeks after entrance in the other 10 per cent. In 77 per cent. the murmurs were heard both at base and apex, 20 per cent. at apex alone, and 3 per cent. at base alone. The murmurs were loud, sometimes musical, frequently transmitted to the axilla, and usually associated with an accentuation of the second pulmonary sound. They were not affected by change in the position of the patient. The majority were associated with irregular heart action, and outlasted the fever. Cardiac enlargement was infrequent, except for the changes due to chronic heart disease. Autopsies have shown that actual endocarditis and pericarditis are extremely rare complications of diphtheria.

In view of the characters mentioned above, White and Smith do not consider the murmurs as functional, but as due for the most part to actual changes in the heart wall or papillary muscles. They regard them as due largely to relative mitral insufficiency resulting from changes in the heart muscle, or to changes in the innervation of the heart. The use of the term relative insufficiency seems to me unfortunate, for it implies sufficient dilatation of the ventricle to make the valves leak, while, as a matter of fact, the leakage is due not to dilatation, but to inco-ordination in the action of the papillary muscles. The term muscular insufficiency has been suggested for such cases, and it appears to be a better one.

The duration of the murmurs was usually several weeks at least, and in about 78 per cent. of the cases one or more murmurs were present at the date of discharge. The duration after leaving the hospital is unknown except in a few instances. Five or six cases were examined eight to ten months later, and each showed a murmur. Two of these showed also some cardiac enlargement with irregularity and weak first sound, probably a chronic myocarditis.

The first sign of cardiac disturbance was the murmur in 89 per cent. of the patients, a murmur with irregularity in 10 per cent., and irregularity only in 1 per cent. The small group of cases in which the heart symptoms were especially important are of three separate types, usually declaring themselves during or after the second week. The first and most serious type shows gallop rhythm, vomiting, epigastric pain and tenderness. The majority of these die after two or three weeks.

The second type shows a rapid, regular, or irregular pulse, easily affected by exertion, and lasts for weeks or months before recovery finally takes place.

The third type is rare, and its main feature is a bradycardia coming on at the end of the second or beginning of the third week. The pulse drops to 30 or even 20. The heart sounds are weak; the heart is moderately dilated. This was seen three times, and all the cases ended fatally.

Gallop rhythm is usually preceded by a period of rapid pulse, 140 or more, and the more sudden its appearance the more serious the outlook. This rhythm may continue for several days without much else except that the child is pale, restless, and without appetite.

Vomiting is apparently unattended by nausea and is accompanied by epigastric pain and tenderness. These persist until death or recovery.

The duration of life after the appearance of these symptoms is usually short, one to three days, but recovery is possible, especially in the cases which show no vomiting or abdominal tenderness.

Of the 36 cases in which serious cardiac symptoms appeared, two-thirds died. The effect of late treatment is shown by the fact that four-fifths of the fatal cases had no treatment until after the fourth day. All but two of these patients had at entrance a pulse of over 120 and several over 140.

Gallop rhythm was found in all these cases, appearing once on the sixth day, once on the twenty-seventh, and in all others from the ninth to the eighteenth day.

Late vomiting appeared in two-thirds of the cases and was present in all but four of the fatal cases.

Epigastric pain and tenderness is particularly bad, for nine-tenths of the patients showing it died.

The illness of those who recovered was prolonged six to twelve weeks, and all but one developed a multiple neuritis. Two-thirds left the hospital with an irregular heart and all but one showed murmurs at base and apex.

The treatment consists largely in rest in bed. In mild cases it is usually safe to let the patient out of bed at the end of two weeks, but the presence of markedly abnormal pulse rate, irregularity, cardiac dilatation, and gallop rhythm demand keeping the bed for weeks longer. All severe cases, and especially so when the antitoxin is given late, should be kept in bed for at least three weeks, even though none of the above-mentioned symptoms appear.

If symptoms appear strychnine is more useful than alcohol or digitalis given hypodermically if vomiting occurs. At the first appearance of vomiting rectal feeding should be begun and chips of ice only given by mouth. Cocaine in doses of $\frac{1}{12}$ grain by mouth may allay the vomiting; morphine in appropriate doses allays restlessness and pain.

Dysentery. It has become clear that the various forms of the bacillus dysenteriæ are very widely diffused throughout the world, and that many cases which do not present the clinical picture ordinarily suggested by the word dysentery are nevertheless the result of infection with this group of organisms. So far as one can conclude from the data at hand, both the Shiga and the Flexner variety are capable of exciting intestinal disturbances ranging from the mildest diarrhœa to the most severe bloody flux. The true nature of these cases can be determined by bacteriological methods only, including among them the agglutinating power of the blood serum. It is much to be regretted that the agglutinating phenomena do not appear early. This test is suitable for clinical use, but the cultural examination of the stools is too slow and laborious and requires too special a knowledge and equipment to be available to practitioners remote from the large centres. This will be a serious thing if the antidysenteric serum proves to be as specific as it is hoped, and unless other and more available methods of diagnosis are developed we will then be forced to employ the serum, even though the diagnosis is not complete, and be thankful that this serum is as harmless as the diphtheritic antitoxin.

The frequency with which the Shiga bacillus is found is shown by an article by La Fetra and Howland,[1] who report a series of 62 cases of intestinal infection by the Shiga bacillus in infants, studied rather from a clinical standpoint, although in each case the diagnosis is based upon a bacteriological study of the stools. The report is the more important because there has been no effort to select the severe cases, as has been done in other reports, but all cases of mild diarrhœa and intestinal infection as they came to the Vanderbilt Clinic were examined.

Two cases were seen in June, 33 in July, 18 in August, and 9 in September of 1903. The age and character of the illness is shown in the following table:

	Mild.	Moderate.	Severe.
Up to 3 months	5	1	2
3 to 6 "	7	4	2
6 to 9 "	3	9	3
9 to 12 "	0	5	3
Over 12 "	1	11	3

The older children are more apt to suffer from the severe attacks, probably because of the feeding. Of the 14 severe cases 1 was breast-fed, 5 were given condensed milk, 2 Straus' sterilized milk, 2 grocers' milk, 3 fairly clean bottled milk, and 1 not stated.

The symptoms had been present in the cases for from one day to three months when presented at the clinic, but in 40 of the cases they had lasted one week or less. Twenty-eight of the cases were under observation from one to three days, 12 from four to seven days, 10 from eight to fourteen days, 8 two weeks and over. The condition of nutrition when first seen is noted, and while some of the well-nourished children were severely ill, none of the emaciated were mildly ill. Sixteen cases were mild; by this is meant that the temperature did not rise above 100.5°, and there were not more than ten stools per day. The stools contained undigested food and mucus, but no blood.

Thirty-one cases were moderately severe, showing a temperature above 100.5°, with frequent passages containing mucus and sometimes a slight amount of blood.

Fourteen cases were severe, with marked constitutional symptoms, great depression, frequent mucous and often bloody stools. The temperature was usually high, but some of these cases were almost afebrile. Four cases are known to have been fatal; others may have died, but none were moribund when last seen.

There were 14 cases, exclusively breast-fed, that suffered from infection with the bacillus dysenteriæ.

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[1] New York Medical News, March, 1904.

The type of infection varies. In 42 the acid, Flexner Manila, or Harris organism was found; in 15 the alkaline or true Shiga type, and in 5 both types were found. There seemed to be no difference in the severity of the disease attributable to the type of infection.

TREATMENT. Milk of all sorts was immediately discontinued, and barley-water, broth, or some proprietary food, or, rarely, albumen-water was given in its place. Catharsis by calomel and castor oil was the invariable rule. When there was great tenesmus, rectal irrigation, with or without paregoric, was employed. Alcohol sponging was employed for temperature.

Ten cases, all severe, were given serum; 4 were of the acid type, and were given the Harris serum; 6 were of the alkaline type and the Shiga serum was employed; 10 to 20 c.c. of the serum were given. One case was moribund at the time of injection, 1 died three weeks later from marasmus and without a return of the diarrhœa, and in 4 other cases the serum apparently had no special effect.

The authors would emphasize the great prevalence of the dysentery organism in infantile diarrhœa (62 of 64 consecutive cases), that all types of diarrhœal disease are found among these cases, and that no less than 20 per cent. of the cases were breast-fed.

One important fact brought out by this report is that breast-fed children are liable to this infection; not a new fact, but it certainly is a surprise that one-fifth of the cases of this infection occur among this group of children. One must wonder where these children acquire the infection, and the drinking-water is a source which naturally suggests itself. It seems clear that one must be as careful of the baby's drinking-water as one is of the water of adults.

Rotch has been far less successful in hunting for the Shiga bacillus in the stools of his cases of diarrhœa. He[1] has an article upon diarrhœa in infancy and childhood which includes much valuable material that does not belong under this section and is therefore omitted. The relation of acute diarrhœa to the dysentery bacillus was studied in 61 consecutive and unselected cases of diarrhœa, and 16 per cent. of them proved to be the result of infection with the bacillus dysenteriæ. The diarrhœa may be either of the fermentative or the ileocolitic type. In the 10 cases in which the organism was found it caused symptoms of fermental diarrhœa in 30 per cent. and those of ileocolitic in 70 per cent. Only 6 per cent of the fermental diarrhœa cases proved to be due to this organism, but it caused 78 per cent. of the ileocolitic cases.

Why Rotch was so much less successful in demonstrating the Shiga bacillus than La Fetra and Howland is not clear, and the difference between the 16 per cent. of one and the 97 per cent. of the others demands additional work to explain it.

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[1] American Medicine, 1904, i., 737

Howland in the *Medical News*, March 5, 1904, makes a report upon the autopsies of children dying of intestinal infections in the New York Foundling Hospital, the Babies Hospital, and the Nursery and Child's Hospital. The Shiga bacillus was found in the great majority of the cases, sometimes in the feces, ante-mortem or post-mortem, and sometimes in the scrapings from the intestinal mucous membrane. In all cases the bacillus was of the acid or Flexner variety. Howland concludes that this bacillus is capable of causing a wide variety of pathological changes, and that a large percentage of cases dying from this form of infection show no profound structural changes. The evidence indicates that the primary necrotic changes are due to the action of the dysentery bacillus and that the subsequent ulceration is due to the action of various other organisms. All grades and types of diarrhœal disease, as distinguished by clinical and pathological findings, may result from the Shiga bacillus.

Reference has already been made to the agglutination of the dysentery bacillus, and it has been pointed out that, while this reaction is frequent and occurs even in high dilutions, it does not appear early, being uncertain during the first week and often absent during the second also.

Reports upon the therapeutic value of antidysenteric serum are still contradictory, some showing negative or indifferent results, others reporting success. The most extensive article is by Rosenthal.

ANTIDYSENTERIC SERUM. Rosenthal[1] reports upon the use of serum in all cases between June and October, 1903. Most of the cases are to be classed as severe, using as a basis (Filatow) thirty or more stools per day as the criterion of a severe case. The general mortality in the Moscow Hospital at the time was 50 to 75 per cent. The serum was employed in all cases with the exception of 10 mild ones. It was also omitted in a number of cases in whom the dysentery developed as a complication of some fatal illness. In all 157 cases were treated, 63 females and 94 males, ranging in age from ten to eighty years; 30 per cent. between ten and twenty, 50 per cent. between twenty and forty, and the rest from forty years up.

Only 40 were examined bacteriologically, and in all with positive results. About 15 per cent. of the cases entered during the first three days of the illness, about 50 per cent. in the second half of the first week, 25 per cent. in the second week, and the rest later. Cathartics and enemata were avoided and the only medication was valerian and coffee. The diet consisted of bouillon, milk, white bread, eggs, and a little meat.

The average dose of the serum was 20 to 40 c.c., but in the severe cases up to 140 c.c. were used. No ill effects were noted, but erythema, urticaria, and joint swelling occurred a few times. The serum was of such a strength that each c.c. contained 100 antitoxin units, determined in just the same way that the unit of the diphtheria antitoxin is. The effects were particularly striking when the serum was used in the first three days of the disease. In the majority of these cases the disease was controlled within one to two days; the blood and mucus disappeared, the pain and tenesmus stopped. The serum worked well, but not so rapidly when employed later. The patients were improved within eighteen to twenty hours, and within twenty-four hours more the stools were less frequent, the blood and mucus had disappeared, the pain and tenesmus were much lessened, and in the course of two or three days more the patient was well. The recovery was final, relapses being rare, being noted only twice in this series. Transition into a chronic dysentery was even less frequent.

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[1] Deutsche med. Wochenschrift, 1904, p. 691.

Among the 157 cases there were 8 deaths, and 3 of these occurred from other diseases (streptococcus angina, pneumonia, tuberculous meningitis), after the dysentery was cured. Deducting these cases we have a mortality of 4.5 per cent. Three of the fatal cases entered at the end of the first week and 4 at the end of the second week.

According to the health reports the mortality from dysentery in the Moscow hospitals for adults for the past ten years ranges from 17.5 per cent. to 12.2 per cent. During this period the mortality of other hospitals has averaged 10 per cent., and in the Alt-Catharinen-Spital, where these cases were treated, the mortality was 10 per cent. previous to the employment of the serum.

Rosenthal concludes that the serum has a beneficial action upon all the subjective and objective symptoms of the disease, and that when it is employed within the first three days the recovery is complete in within one or two days.

Epidemic Meningitis. During the past year there have been numerous articles upon this interesting disease. One of the most profitable is that of Berg,[1] of New York City. He publishes an interesting report upon the clinical and other features presented by an epidemic of cerebrospinal meningitis in New York City, where 563 deaths occurred from this disease between January 1 and June 4, 1904. The highest number of deaths (73) was in the week ending May 14th, and the four subsequent weeks showed a gradual decrease. Experience in other epidemics would lead one to hope that this marks the fading of the epidemic. The disease shows a marked tendency to attack the young, and something more than three-fifths of the deaths were in children under six years, but nevertheless the proportion of older children and adults dying in this epidemic is very much greater than in any other epidemic the statistics of which are known to Berg. Moreover, the cases in adults and older children were more severe.

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[1] Medical Record, 1904, p. 404.

In this, as in all recorded epidemics, there was noted a synchronous increase in the deaths from *pneumonia.* This fact is the more interesting because of the close morphological similarity between the diplococcus pneumoniæ and the diplococcus intracellularis meningitidis. These two organisms are now believed to be distinct by most bacteriologists, and the latter is regarded as the cause of most epidemics of meningitis, although the former is admitted to be the cause of some.

Personally I cannot but be impressed by certain facts which suggest a very close relationship, even possible identity, between these two organisms. The constancy with which epidemics of meningitis are accompanied by an increase in deaths from pneumonia, the frequency with which pneumonia and meningitis are found together, the sudden onset, the chills, the leukocytosis, the herpes common to both diseases, are all suggestive of some close relationship. The herpes is a thing to which especial attention should be called. This eruption is common in but three diseases: malaria, pneumococcus infections, and in epidemic meningitis. Malaria is so distinctly a disease of another sort that we need not here consider it. This leaves us two infective processes presenting many clinical differences, but having one striking symptom common to them both and rarely seen in other infections, the herpetic eruption. One swallow does not make a summer, but when two supposedly distinct diseases like pneumonia and epidemic meningitis are found to be due to organisms so closely alike as the pneumococcus and the meningococcus, and present in common and with great frequency one symptom like herpes, which is rarely seen in other infections, the temptation is strong to contrast the clinical evidences of these two organisms in favor of their identity with the bacteriological evidences of their distinctness, and personally I am more impressed by the clinical than by the bacteriological data.

Another point to which attention should be drawn is that herpes in epidemic meningitis is apparently not due to the localization of the organism in the meninges, for it is only in this form of meningitis that herpes is seen. It is very rare to see it in tuberculous or pyogenic meningitis. It is, however, common in pneumococcus meningitis.

Returning now to Berg's report, it is to be noted that he found a few instances of apparent contagion, something not previously recorded. He saw, for example, three children in one family, a mother and daughter, and knows of two other instances in which two members of the same family were taken with the same disease.

Nothing is known of the incubation period, and but little of the mode of spread. Many believe that the infection atrium is the nose, whence it spreads by the lymphatics to the dura and subarachnoid spaces. It is possible that infection spreads through the blood, although the organism has not been found in blood cultures.

The germ is often found in the nasal discharge of patients with the disease, and for this reason all handkerchiefs and towels should be carefully sterilized, and care taken to avoid the diffusion of the nasal secretions. The organism is very resistant to drying, and all rooms and all bedding used by the patients should be thoroughly fumigated.

Berg reviews both the constitutional and nervous symptoms of the disease, but attention here need be given to but three. These are the blood changes, consisting of a leukocytosis of 18,000 to 30,000, the increase being mainly in the polymorphonuclear form. The blood cultures so far made have not yielded satisfactory results, but it is to be hoped that they will be made properly and repeatedly whenever an opportunity presents itself. It will be surprising if the bacteria are not found as frequently as they are now found in pneumonia.

The lumbar puncture yields valuable signs. The bacteria are found in smears and by culture in 100 per cent. of the cases. Battencourt and Franca found them in all of 271 cases examined. Examination of the cells found shows them to be 90 per cent. polymorphonuclear and 10 per cent. mononuclear.

Berg has much confidence in Kernig's sign as evidence of involvement of the cord, and speaks of it as most useful and distinctive in both adults and children. A diminution of the Kernig sign has a favorable prognostic significance.

Treatment has not progressed as our knowledge of symptoms, etiology, and pathology has. Berg employs repeated lumbar puncture if the cerebrospinal fluid flows from the cannula in a continuous stream under tension. If it does not, the puncture does no good. Battencourt and Franca treated their cases by injections of a $\frac{1}{10}$ per cent. solution of lysol. Berg employs sodium iodide in 5 to 10 grain doses every three hours in a child over a year old, and 15 to 20 grains in an adult. He uses also mercurial ointment, 15 grains, twice daily, to the spine in adults. Ice-bags to head, neck, and spine, and baths at 80° F. for temperature above 103°. Care, cleanliness, a large and airy room, and attention to eyes and ears are also imperative.

Berg in speaking of the treatment mentions the fact that cases have been treated by intraspinal injections of lysol solution, but has not himself tried it. Manges and Nammack have both tried this method, and, while their experience is too limited to warrant any conclusions, the current methods of treatment are so futile that one is tempted to try anything which offers any reasonable chance of improvement. It is to be hoped that the coming year will bring many reports upon the employment of these injections, and that the result may be as favorable as those reported from Lisbon.

Manges[1] reports upon 3 cases of epidemic meningitis treated by intraspinal injections of *lysol* solution. He was led to try this partly by the generally appreciated uselessness of the current methods of treatment and partly by the favorable report by Seager, who saw 31 cases treated in Lisbon by this method. There were 13 deaths, 5 from dilatation of the cerebral ventricles, 2 from pulmonary tuberculosis, 1 from œdema of the glottis, 1 from purulent pneumonia, and 4 from the disease without complications. The 18 that recovered were completely cured. The method of treatment consists in withdrawing varying amounts, often as much as 50 c.c., of the cerebrospinal fluid. In some cases, those in which the fluid was very tenacious, normal saline solution was injected through one needle and allowed to escape through another. After this irrigation 3 to 9 c.c. in children and 12 to 15 c.c. of a $\frac{1}{10}$ per cent. solution of lysol was injected. The injections were repeated once daily till the fluid was clear.

Manges treated 3 cases, one due to the meningococcus, 1 to a virulent streptococcus, and the third to an organism which for some reason was not studied. All three of the cases made complete recoveries.

Nammacke[2] also has had a limited experience in the use of the lysol injections. He has employed them in 5 cases, 4 of which were due to the meningococcus and 1 to an organism which was probably staphylococcus. Only one of the cases recovered. Two of the cases caused by the meningococcus were associated with malignant endocarditis, generally considered to be a rare effect of this organism.

Malaria. This disease has been so thoroughly worked over that there seems but little left unknown, and unless the future opens up new lines of thought the coming years will see but few contributions. Most of the articles this year have been upon methods and efforts made toward the extermination of the mosquito. Municipalities and societies are working in many places upon these problems, and are meeting with a success which leads to the hope that the mosquito will cease to be a pest.

Krause appears as an advocate of the employment of differential counts of the white blood cells as a means of diagnosis, and believes them, while less certain than the demonstration of the plasmodium, to be easier in many cases. In making such counts it is not necessary to know the absolute number of leukocytes, only their relative proportions. Blood smears are made at the bedside, and when convenient they are fixed, stained, and counted. There are certain types of malaria in which prolonged and repeated search for the organisms ends in failure. In these cases the differential counts will prove a valuable help.

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[1] Medical News, May 14, 1904.

Medical Record, i., 1904, 910.

Krause,[1] of Memphis, makes a report upon the value of the differential count of the white blood cells in the diagnosis of malaria. This subject was considered in the last article upon malaria in PROGRESSIVE MEDICINE, and Delaney's conclusion that an increase in the proportion of the large mononuclear cells to or beyond 12 per cent. was highly suggestive of malaria was quoted. Krause concludes, from a study of some 200 blood spreads, that it is not so much the absolute increased percentage of large lymphocytes which is diagnostic of malarial infection as the relative increase over the small lymphocytes. Of 204 malarial cases the percentage of the various forms of white cells was found to average as follows: small lymphocytes, 14.8; large lymphocytes, 19.5; polymorphonuclear, 63.7; eosinophiles, 2.0.

Krause's results are much more convincing than Delaney's. The latter found the plasmodia in only 17 per cent. of his cases, while the very great majority of Krause's diagnoses of malaria were proven by the demonstration of the parasite. Krause further concludes from his work that:

1. In cases of malarial infection, without much fever and without quinine history, the polynuclears are markedly diminished and the large lymphocytes very much increased in proportion.
2. In the absence of an adenopathy, possibly also of influenza and measles, the above finding is positive evidence of present or very recent malarial infection.
3. During the rise of a malarial fever, or as a result of quinine therapy, the polynuclear leukocytes may reach 80 per cent., but in that event the large lymphocytes exceed in number the small ones.
4. In malarial hæmoglobinuria any of the various blood findings characteristic of malarial fever may be present in any stage, and there is no evidence now at hand to explain this.
5. Malarial and typhoid fevers can be more positively differentiated from fevers of sepsis, pneumonia, rheumatism, malignant tumors, etc., by the differential leukocyte count than by the hæmocytometer, and it can be done on dried films, away from the bedside.
6. Malarial infection makes a strong impress on the leukocytic relation, no matter with what other disease it is associated.
7. It is not safe to rule out typhoid fever when the malarial variation is found, but, as it calls for antimalarial medication, the therapeutic test may decide before a Widal reaction would appear.

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[1] Journal of the American Medical Association, 1904, ii., 1202.

8. In a gradually developing fever the absence of marked increase in the large lymphocytes or polynuclears during the first week justifies a preliminary diagnosis of typhoid fever.

In the discussion of this paper R. N. Willson, of Philadelphia, brings out a point which I do not recall having seen before in print, although I have been familiar with the fact ever since 1894, when malaria was common in Chicago. At that time it was noted that in certain cases most careful search failed to find the malarial parasite until after quinine was given. It is interesting to find this observation confirmed after the passage of years.

Measles. This disease has received somewhat more study than last year, but there is still no effort made, so far as one can judge from the literature, to discover the causal organism. Several of the important symptoms have received discussion. One of the most important, because of its early appearance, is the so-called Koplik spots.

KOPLIK SPOTS. These have been carefully studied by Müller.[1] Upon the basis of an epidemic of measles numbering 215 cases Müller makes a report upon the Koplik spots, the diazo reaction, and the course of the fever in this disease. Like practically every reporter so far on record (the exception being Aronheim, who found the Koplik spots but 9 times in 150 cases of measles), Müller found the Koplik spots an early and very constant symptom, finding them in 134 of 166 cases carefully examined —*i. e.*, in 81 per cent. of the cases. He had but 12 opportunities to examine cases from the very beginning, and in 7 of these found the spots at the time of the first elevation of temperature, and 4 times they appeared during the second or third day. Once they did not appear. Eight times the spots preceded by one-half to two days the initial rash, which Müller found on the hard palate in 143 of 166 cases—*i. e.*, 86 per cent. As Widowitz and Motta-Coco pointed out, the flecks are not peculiar to measles, for they occur also in rötheln, Müller finding them in 6 of 14 cases of this sort. The frequency of the Koplik spots is shown in the following table:

Slawyk	45	times in	52	cases.
Havas	16	"	16	"
Perkel, prodromal stage	32	"	33	"
Perkel, eruptive stage	67	"	92	"
Rolly	67	"	87	"
Lorand	329	"	348	"
Müller	134	"	166	"
	690	"	794	"

THE DIAZO REACTION was found 41 times in 42 cases examined at the height of the fever. In 10 cases examined before the initial fever 8 failed to give the reaction until after the eruption appeared and 2 showed it a half-day before.

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[1] Münchener med. Wochenschrift, 1904, p. 99.

TEMPERATURE. Müller concludes that most uncomplicated cases of measles show, during the initial catarrhal stage, a short and rapid rise of temperature, then an intermission of one to two days, and lastly a second sharp rise of temperature, which continues for about four days and then rapidly falls. Less often the temperature rises gradually, and still less frequently rises sharply without any warning.

The temperature course in measles is also described by Berg[1] as follows: During the exanthematic period the temperature rises toward night and declines about a degree toward morning. This lasts from two to five days. There is a sharp decline, sometimes to within a degree of normal, on the morning of the day when the skin eruption appears. With the appearance of the eruption the temperature rises rapidly and usually to a higher level than before. As the eruption spreads to the chest and the abdomen the evening temperature rises still higher. During the day the eruption becomes complete, the evening temperature is not quite so high, and during the night and following morning it falls abruptly to or nearly to the normal.

BLOOD CHANGES. The increasing attention which is being given to the changes in the white blood cells, not alone their absolute number but also to the relative proportions assumed by the various type of cells, leads me to quote an article by Erber. He[2] makes a detailed report upon the blood findings in measles, *scarlet fever*, and *chickenpox*, from which the following may be quoted as containing that which is of the most value to the practitioners. In measles there is scarcely any change in the number of red blood corpuscles and the quantity of hæmoglobin undergoes but little reduction. In uncomplicated cases the leukocytes are not increased in number; on the contrary, during the period of eruption there is a very considerable fall in their number, and, inasmuch as this fall is mainly due to a decrease in the number of the small lymphocytes, the polymorphonuclear neutrophiles show a higher percentage count than normal—*i. e.*, an absolute leukopenia and a relative leukocytosis. At the height of the fever the eosinophiles disappear entirely.

In scarlet fever the red blood corpuscles gradually decrease in number during the course of the disease, and somewhat more rapidly there occurs a fall in the hæmoglobin content. There is a very considerable increase in the number of polymorphonuclear leukocytes, and, inasmuch as the lymphocytes remain practically normal in number, this increase is both absolute and relative. This is in contrast with measles, in which the increase is relative only. The eosinophile cells are practically unaltered.

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[1] Medical Record, 1904, ii., 1.

[2] Zeitschrift für Heilkunde, 1904, p. 274.

In varicella the blood picture is still different. Here the number of white cells is normal, but the proportions of the various forms are so altered that the mononuclear cells are more numerous than the polynuclear.

Conjunctivitis. The bacterial aspect of this symptom of measles has been studied during the year, and one fact which may prove to be of major importance was found, namely, that the bacterial content of the conjunctival sac was different in severe and fatal cases, the streptococcus being here much more frequent than in the milder cases. This suggests the possibility of this organism being often the cause of death in this disease, as it is in scarlet fever, and that it would be well, in families and in hospitals where these cases occur, to make routine examinations of the conjunctival and nasal secretions for the streptococcus, and separate cases in which it is found from the others. This is being done with benefit in the scarlet-fever wards, and the suggestion seems reasonable enough to warrant its trial in the case of measles.

This work is reported by Schottelius,[1] who made a study of the bacterial content of the conjunctival sac in 40 cases of measles and in 40 children dead of measles. In all circumstances the cultures were positive. The staphylococcus aureus was found 25 times in the living and 26 times in the dead. Much greater difference was found with the streptococcus, which was found 5 times in the 40 living and 20 times in the 40 dead.

Otitis Media. Another important complication of measles has been carefully described during the year. Otitis media, while frequently mentioned as a complication of most of the acute infectious diseases of childhood, is not often mentioned in connection with measles. The frequency with which this complication occurs varies in different epidemics, but that reported by Cioppi shows the highest percentage, about 50 per cent. The number of cases depends largely upon the care used in hunting for them. Nadeleczny[2] reports upon the ears in 100 cases of measles. He found that 59.5 per cent. of all the cases had acute inflammatory disease of the middle ear. This makes it one of the commonest of the complications of measles. It is also to be noted that this usually develops during the first two weeks and may appear even in the prodromal stage. It may, however, be delayed until the period of desquamation. The inflammation of the middle ear usually causes distinct subjective symptoms. It is oftenest a mild process, tending to spontaneous recovery, but it may go on to suppuration and mastoiditis.

Jessen[3] reports a case of acute *polymyositis* following measles, an unusual complication indeed, not so far reported.

Edens in the same article adds the report of a case of *polyneuritis* following measles. A number of nervous sequelæ are recorded in the literature upon measles: paralyses of both cerebral and spinal origin, pseudo-multiple sclerosis, and tic. Morton and Monro have each reported a case of polyneuritis after measles and Edens adds a third. His case was a girl of sixteen, who after a severe but typical attack of measles developed the usual picture of a multiple neuritis. The nervous symptoms began on the twelfth day of the illness and consisted of pain, tenderness along the nerves, anæsthesia, and paralysis affecting all four extremities. The symptoms gradually disappeared and recovery was complete in a month.

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[1] Münchener med. Wochenschrift, 1904, p. 378.

[2] Jahrb. für Kinderheilkunde, 1904, p. 310.

[3] Berliner klin. Wochenschrift, 1904, p. 847.

Mumps. In view of the widespread opinion that parotitis is an insignificant affair, requiring practically no attention, an article by Tatschner[1] is of interest. The only complications of mumps which have received much attention are the genital and mammary metastases. These, however, are not the only ones; for one finds here and there reference to such complications as meningitis, cystitis, nephritis, keratitis, conjunctivitis, retinitis, neuritis, otitis, endocarditis, pericarditis.

Tatschner had the unusual opportunity of observing four cases of *endocarditis* developing in four children of the same family. The cases all occurred during the same epidemic of mumps. Not one of the cases was particularly severe and none presented during the course any cardiac symptoms. The heart lesions manifested themselves only after the passage of some months. In one of the children the lesion was found two months after the attack of mumps and the other three were found some two months later.

These cases were the only ones found in the epidemic which Tatschner studied, and show in the first place that mumps is quite capable of causing serious complications, and that patients recovering from this disease should be kept under observation for months.

Pneumonia. During the year there has been a very large amount of work done upon this disease, now generally recognized as one of the most important of the acute infectious diseases, if indeed it is not the most important to all living in temperate climates. The growing importance of pneumonia received recognition in the appointment by the New York City authorities of an able commission of clinicians and pathologists for a special study of this disease, and it is to be hoped that some good may come from the work, and that something may be devised to lessen or prevent its rapidly increasing frequency. Attention was drawn last year to the truly alarming increase of pneumonia, and the past year has shown no improvement in this regard. The year shows also an increasing tendency to regard the disease as contagious and to require the isolation of the cases from other patients. As I have already stated, this idea does not especially appeal to me, although I am familiar with the absolutely numerous but relatively rare example of such contagion. To these have been added an interesting hospital epidemic by Edsall and Ghriskey,[1] who utilize a small epidemic of pneumonia occurring in their hospital work as a text for an article upon the transmission of pneumonia and the methods by which it can be prevented. April 3, 1903, a patient died of pneumonia in bed No. 2 of a side ward in the Episcopal Hospital, and within the next eleven days two patients placed temporarily in this bed developed pneumonia and the pneumococci were found in the blood of a third. On the twelfth day a patient in a neighboring bed was found to have the pneumococci in the blood, although no symptoms resulted from them. The ward was then fumigated with formalin and no further cases occurred.

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[1] Wiener medizinische Wochenschrift, 1904, p. 1453.

Such instances as these, of which there are now a considerable number in the literature, are utilized as evidence of the contagiousness of pneumonia and as arguments for the isolation of such cases. The recommendations of various authors, that the sputum and other excreta of pneumonic patients should be destroyed and that attendants of pneumonic cases should avoid any unnecessary contact with them, are readily agreed in, but that the cases should be isolated appears to me to be unnecessary.

As to the contagiousness of pneumonia I am very doubtful, although I have seen and reported examples as striking as those reported by Edsall and Ghriskey. The reasons for doubt are that in view of the very great frequency of pneumonia instances of contagion should be of daily occurrence instead of being exceptional. In every hospital in the world many thousands of cases of pneumonia are treated yearly, and yet such experiences as the one referred to above are so very rare that they are seen by but few. The disease is being constantly treated in the home, and yet examples of multiple cases in the same house are very rare. No one of the other contagious diseases presents any such opportunities for argument. Even the most limited experience with measles, or scarlet fever, or diphtheria will furnish numerous instances of contagion, but an experience covering thousands of cases is required to find examples of what is apparently contagiousness of pneumonia.

Furthermore, numerous authors have in the past reported upon the large number of normal individuals who have in their respiratory passages the causal organism of this disease, and Dürck and others have shown the great frequency with which the same organism is found even in the deepest portions of the lungs of freshly slaughtered animals. To speak of contagion in connection with an organism so ubiquitous as the pneumococcus appears to me to be unnecessary, and to limit its diffusion by the destruction of the sputum of patients, as is done with tuberculous sputum, appears perfectly hopeless unless the sputum of all human and domestic animals (if they have any) is also destroyed.

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[1] Therapeutic Gazette, 1904, p. 147.

For the present at least I believe that the prophylaxis of pneumonia is a question of personal hygiene rather than one of isolation and fumigation. The profession and the general public have long believed in the influence of meteorological conditions in the causation of pneumonia. There is no aspect of the etiology of disease more difficult to discuss intelligently than just this one. It requires the possession of large masses of data, uninteresting in themselves, and patient and thoughtful consideration of them. Anders[1] has made such a compilation and during the year has published them in a very elaborate and laborious article upon the influence of meteorological conditions in the causation of lobar pneumonia. He reaches the following conclusions, some of which are in accord with former opinions; others are at variance with them:

1. Seasons exert a marked effect upon the prevalence of lobar pneumonia, the maximal mortality being observed during the winter and spring months.
2. Insular climates probably manifest the greatest rise in pneumonia mortality in winter, while that of continental climates coincides mainly with spring.
3. The mortality of the epidemic form of the disease is, to a less extent, influenced by the seasons, and may occur in the fourth and even third quarter of the year.
4. An apparently close relationship exists between periods of low temperature and the death rate from pneumonia.
5. The mortality rises and falls with the barometric pressure, the maximal level being reached during periods of highest pressure, and vice versa; that the barometric pressure, however, is governed by the temperature, being inversely as the latter, is to be recollected.
6. The average velocity of the winds and the death rate from this disease would appear to stand to one another in the relation of cause and effect (a provisional explanation of this fact being found in the controlling influence exerted by the winds upon temperature and barometric pressure).
7. The coincidence of existing low temperature, high barometric pressure, the direction and velocity of the winds, and the maximum mortality from pneumonia is so uniformly constant as to warrant serious consideration and suggest a close and direct relation between their combined influence and the progress of mortality from pneumonia.

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[1] American Medicine, 1904, p. 407.

8. The mean relative humidity of the atmosphere shows equally decided variability, during the period of abeyance in the prevalence and fatality of the disease, with that of the cold or annual pneumonic season.

9. The major influence exerted by the seasons, however, is probably not direct (*e. g.*, by a lowering of the bodily resistance due to low temperature, high barometric pressure, direction and velocity of the winds, etc.), but indirect, namely, by bringing about that effective element in the causation, concentration, and increased virulence of the specific poisons, in consequence of closed doors and windows and lack of free ventilation.

It would seem that of these conclusions reached by Anders the last is the most important, and so far as present knowledge goes contains the kernel of the matter. Fortunately this is the only influence under our control. The general temperature and direction of the wind are independent of us, but we certainly can avoid the overheating and underventilating of our living-rooms. Much in the way of prophylaxis can be accomplished in this way, far more than can be done by the isolation of the patients. Our individual resistance to infection can be increased by leading proper lives, by living and sleeping in cool, well-ventilated rooms, and by avoiding overeating, overdrinking, and overworking. If, in spite of a rational life, infection still takes place, the chances of successfully overcoming it are materially increased. These, in my opinion, are the things which we must teach the public, and upon them we must concentrate their attention and thought.

The futility of attempting to avoid exposure to the pneumococcus is made more obvious by some work reported by Dürck. The fact that the pneumococci are frequently present in the pharynx and nose of people who have never had pneumonia is now well established and generally known. Until lately, however, it has been held that organisms did not penetrate to the deeper portions of the lungs. Dürck has opposed this idea and claimed that even in the most remote parts of the lungs bacteria could be found. He[1] makes an additional contribution in support of his opinion that the lungs are not free from bacteria as is generally stated, but, like the gastrointestial tract, constantly harbor bacteria, both pathogenic and non-pathogenic, and, as in the intestinal tract, they are harmless until some aiding cause either increases their virulence or lessens the defences normally opposed to them. Among other organisms found in the lungs of healthy animals are the streptococcus, staphylococcus, pneumobacillus, and, most important, the pneumococcus. Fraenkel, in his recent work upon the *Spezielle Pathologie und Therapie der Lungenkrankheiten*, says: "The development of a pneumonia requires in the majority of cases some contributory cause. The pneumococcus is the true cause of the croupous pneumonia, but it excites the disease only when its virulence is so great that it can penetrate the natural defences simply because it enters the deeper air passages, or when, because the defence is feeble, the soil is already favorable for its development in the lungs."

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[1] Münchener med. Wochenschrift, 1904, p. 1137.

Of the various influences favoring the development of the pneumococcus Dürck has paid especial attention to exposure to cold both when overheated and when not, and believes that such exposure is important, an experimental observation in striking coincidence with the popular impression of cold as a factor in the causation of pneumonia.

Dürck reviews the studies made by others than himself as to the bacterial content of the normal lungs, with the following results:

Béco in the lungs of 15 healthy house animals found the pneumococcus twice. Boni in the lungs of 20 pigs found bacteria 14 times, including the pneumococcus, streptococcus, staphylococcus, and pneumobacillus. Quensel found bacteria in the lungs of all of 16 calves, 5 horses, 6 pigs, and in 11 of 15 sheep. W. Müller found the lungs sterile in but 5 of 22 rabbits examined.

The influence of cold has been studied by several, with these results: Lode exposed animals, which had been one-half to two-thirds shaved, to heat and then to cold and injected cultures of the pneumobacillus; 85 per cent. of animals thus treated died from pleurisy or pneumonia, while only 12 per cent. of animals injected, but not exposed to cold, died.

These studies would seem to prove that the lungs are not free from bacteria, and that cold is an important factor in the causation of pneumonia.

General conceptions of a disease can be gained only from large experience, larger than can possibly fall to one man, and each one's personal opportunities must, therefore, be enlarged by careful attention to reports of peculiar cases, and more particularly to reviews of long series of cases. The relative frequency and significance of individual symptoms, the guides which they furnish to a proper prognosis, and the indications which they furnish for treatment must all be ascertained in this way.

McCrae, Fyshe, and Ainley[1] published a review of 486 cases of acute lobar pneumonia, and of 100 autopsies observed in the Montreal General Hospital between January, 1895, and August, 1903, 23 per cent. of the cases entered during the months of February and March, and 31.6 per cent. during April and May. This shows over one-half of the cases during these four months, a slightly higher percentage than is usually found.

The influence of sex is seen in the fact that 71.6 per cent. of the cases were males.

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[1] American Medicine, 1904, i., 134.

The mortality from the whole series was 21.2 per cent., and was somewhat higher among the women, 25 per cent. as compared with 21 per cent. The influence of age both upon the occurrence of the disease and upon the mortality is shown in the following table:

Age.	Number of cases.	Percentage of cases.	Number of deaths.	Percentage of total deaths.	One patient died in every
1 to 3 years . . .	16	3.3	5	4.9	3
4 " 15 " . . .	67	13.9	5	4.9	13
16 " 22 " . . .	70	14.5	5	4.9	14
23 " 31 " . . .	98	20.3	19	18.4	5
32 " 41 " . . .	92	19.1	19	18.4	5
42 " 51 " . . .	84	17.4	29	28.1	3
52 " 61 " . . .	33	6.8	11	10.7	3
62 and over	22	4.5	10	9.7	2

Of the various factors usually considered as of contributory etiological influence the authors note particularly previous attacks of pneumonia, race, occupation, the use of alcohol, influenza, and catarrh. Previous attacks of pneumonia were noted somewhat less frequently than usual, only 12.4 per cent. Three patients had had three previous attacks, one had two, and one had one.

It is interesting to note that a considerable proportion of the patients, 16 per cent., were recent arrivals in Montreal, a great many of them being poorly nourished Europeans, chiefly Italians. Of 444 patients 28.4 per cent. were engaged in out-door work and 71.6 per cent. were in-door workers. If one-fifth of the population works out-doors, then this class of population is one and one-half times more liable to pneumonia than the in-door workers. If 1 in 10 is the employed, the out-door worker is three and a half times as liable.

Of 190 cases in which the records are explicit on the question of alcohol, 32 per cent. were alcoholics, 46 per cent. moderate users of alcohol, and 19 per cent. teetotalers.

Acute influenza preceded the disease in 5 cases and catarrh, defined as chronic inflammation of the upper air passages, was present in 20.3 per cent. of the cases.

The average length of time from entrance to discharge from the hospital in 351 cases was 27.5 days. Sixty per cent. of the cases ended by crisis, 28 per cent. by lysis, and in 12 per cent. the fall of temperature was atypical. Of 211 cases in which the precise time could be determined, crisis occurred after the lapse of 7.1 days.

The temperature in 17 per cent. of the cases ranged from 99° to 102°; in 52 per cent. it was from 102° to 104°, and in 31 per cent. it was over 104°.

Of the symptoms usually present at the onset of an acute pneumonia, cough was present in 100 per cent., pain in 92.1 per cent., chilly sensations in 70 per cent., vomiting in 35 per cent., and rigor in 6.1 per cent. The pain was never referred to a region other than the seat of disease.

Rusty sputum appeared in 44.9 per cent. of the cases. The only nervous symptoms which were common were headache, present in 42 per cent., and delirium, present in 35 per cent. Mania and convulsions were each noted eight times.

The influence of alcohol on the delirium was noted; 59.2 per cent. of the cases were in non-alcoholics. Of 62 heavy drinkers, 37 were delirious: of 92 moderate drinkers 27 were delirious.

The bowels were normal in 57 per cent., diarrhœic in 12 per cent., and constipated in 31 per cent.; jaundice was noted but 18 times; albumin was found in the urine in 22 per cent. and casts in 1.5 per cent., both together in 25.7 per cent.

Sweating, profuse enough to be noted and occurring independently of the crisis, was found in 32 per cent. Herpes was noted in 26.1 per cent. Leukocytosis of more than 7500 was found in 43 of 45 cases.

The distribution of the process was as follows: right lung only, 48 per cent.; left lung only, 30 per cent., both lungs 22 per cent. The mortality in the bilateral cases was 31 per cent., in the left-lung cases 15 per cent., and in the right-lung cases 21 per cent.

The cases were treated in various ways; some with hydrotherapy; expectorants were given in a third of the cases; medicinal analgesics in one-tenth; ice and heat in a fourth; stimulants in three-fourths. The complications noted were: pleuritis, 163; emphysema, 28; meningitis, 23; otitis media, 19; empyema, 18; acute endocarditis, 16; myocarditis, 14; acute pericarditis, 11; thrombosis, 4; peritonitis, 3.

Some of the data from the 100 autopsy reports are particularly interesting. It is clear that the extent of the pneumonia has great influence upon the outcome: thus, 4-lobe cases make 9 per cent. of the autopsy series and 1 per cent. of the clinical; 3 lobes make respectively 31 per cent. and 20 per cent.; 2-lobe cases make respectively 38 per cent. and 38 per cent.; 1-lobe cases make respectively 21 per cent. and 40 per cent. Twenty-three per cent. of the cases were in the stage of red hepatization and 55 per cent. in the gray stage. The authors lay stress upon the well-known but often-forgotten fact that these stages are not sharply separated from one another.

Of 60 cases in which the bacteriological examination was made, the pneumococci was present in 65 per cent., in 5 per cent. mixed with other organisms; 20 per cent. were mixed infections of other kinds, and the streptococcus was the main factor in 8 per cent.

It is noted also that the spleen was not usually enlarged in the pure pneumococcus cases.

This report, while bringing out little that is actually new, refreshes one's mind of things easily forgotten, and lays stress upon many important features. It appears to me to be a mistake to include in the report cases which were not due to the pneumococcus, for I believe that the inclusion of such cases has been the cause of much confusion in our conception of this disease, and that our idea of the progress and outcome of it would be clarified by rigidly excluding all other forms of pneumonia. If in the future some specific method of treatment is discovered, there will be good practical reasons for such careful exclusion, while to-day the reasons may seem rather theoretical. In contrast with these statistics from adult cases may be quoted a report from Morse concerning pneumonia in infants. Morse's[1] article is important because of the emphasis which it lays upon a number of clinical facts. In the first place, lobar pneumonia is by no means so rare a disease in infancy as is generally assumed; 50 of the 118 cases were in the first year and 68 in the second. The onset is less stormy than in most acute infections at this time of the year. Vomiting was the initial symptom in but 7 of 77 cases with complete histories; convulsion occurred but once and chill not at all. Sudden onset of fever was rarely noted. Cough was noted in 75 of the 77 cases.

The distribution differs somewhat from that seen in adults, for the left lower lobe is the lobe most often involved, 38 per cent. of the entire number. A single lobe was involved in 86 per cent. of the cases.

The fever lasted from four to eighteen days, but the most common duration was seven days. The average duration of the fever was eight and one-tenth days, but was somewhat shorter in cases under one year than in those from one to two years old.

In 84 per cent. of the cases the maximum temperature was between 103° and 106°. In 11 per cent. it was under 103°, and in 5 per cent. over 106°. The highest temperature was 107° in a fatal case. The temperature fell by crisis in 68.8 per cent. of the cases, but it is noted that the crisis was more frequent in cases during the second year than during the first.

The influence of pulse upon the mortality is interesting. There were 17 cases in which the pulse rate did not pass 140, with no death; 11 cases with a pulse between 140 and 150, with 5 deaths; 37 cases with pulse between 150 and 160, with 9 deaths; 23 cases with pulse between 160 and 170, with 5 deaths; 21 cases with pulse between 170 and 180, with 9 deaths, and 8 cases with pulse of from 180 to 200, with 2 deaths.

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[1] Archives of Pediatrics, September, 1904.

In 75 per cent. of the cases the respiratory rate was between 55 and 80. No case died in which the rate was below 55, and above that point the rate of respiration did not seem to have much effect; for example, 6 cases with maximum respirations between 60 and 65 show a mortality of 33 per cent., and 6 cases with maximum rate between 85 and 90 showed the same mortality.

Of the whole series 31 cases died, giving a mortality of 26.3 per cent. Eighteen of these cases were in the first year, giving a mortality of 36 per cent. The mortality in the second-year cases was 19 per cent. Particular attention is demanded by these figures, and they show clearly that while pneumonia may be mild in childhood it certainly is not so in infancy, and that the mortality varies inversely as the age.

Morse outlines the treatment employed as follows: None beyond nursing and regulation of the diet was given in 30 cases. Antipneumonic serum was given to 10, but without effect. Creosotal was used in 6 with no result. Brandy was given to 60 per cent. of the cases, and strychnine to 30 per cent. Aromatic spirits of ammonia were given to 12 patients, digitalis and caffeine each to 1 case. Phenacetin was used in 8 cases and lactophenin in 1. The temperature was, as a rule, but little affected by these drugs and they apparently did no harm.

Cold in various forms was used in 28 cases. Tub baths and sponge baths were generally badly borne. Fan baths, at a temperature of from 100° to 110°, were used in 14 cases. They were badly borne in 1 case, were disliked by another, and caused excitement in a third. Several of the infants seemed to enjoy them, and, with the exception noted, they were always well borne.

HERPES ZOSTER. I am glad to mention an article by Riehl[1] upon herpes zoster in croupous pneumonia, not because I agree with all of his conclusions, but because it draws renewed attention to a symptom, not of croupous pneumonia, but of infection with the diplococcus pneumoniæ, which is too often overlooked. This organism causes three symptoms of primary importance, irrespective of their localization, namely, sudden onset, usually with a chill, a leukocytosis, and herpes zoster. Riehl's observations are upon 481 cases of croupous pneumonia, among which there were 129 examples of herpes zoster—*i. e.*, 27 per cent. This percentage is considerably lower than that observed by Drasche, 40 per cent.; by Metzer, 43.2 per cent.; or by Smoler, 32 per cent. Riehl believes that his low figure is due to the fact that many of his cases entered only a day or two before or even after the crisis, so late that a herpes could entirely disappear. In my opinion even 43.2 per cent. is too low. It probably includes only the cases in which the herpetic eruption is distinct enough to force attention. When, as frequently happens, there is but one or two vesicles, and these hidden in the moustache or within the nostrils, no note will be made of them unless they are looked for. Ninety per cent. will be found nearer right than 27 per cent. Riehl found the age distribution as follows:

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[1] Münchener med. Wochenschrift, 1904, p. 1105.

14 to 20 years	36	cases of herpes.
20 to 30 "	55	" "
30 to 40 "	18	" "
40 to 50 "	6	" "
50 to 60 "	9	" "
60 to 70 "	4	" "
70 to 80 "	1	" "

In his conclusion he says that pneumonia in children and in the senile almost always run their course without herpes. This is very positively different from personal experience, for I have seen herpes many times in both the very young and the very old.

In 79 per cent. of Riehl's cases the eruption occurred upon the third to fifth day, but he saw cases also in which it appeared as early as the second and as late as the twenty-sixth day. This corresponds with the experience of others.

Seventy of the 481 cases of pneumonia died, and of these only 6 showed a herpes. Of the 16 cases between the ages of sixty and eighty, a period of great fatality from pneumonia, it is found that 90 per cent. of the fatal cases between twenty and sixty are without herpes. Riehl does not agree with Geissler's statement that a herpes upon the third day is an unfavorable prognostic sign, but does agree with Strümpell, who says: "We still hold to the opinion that herpes has a certain amount of prognostic significance. At least we are ever anew struck by the fact that the severest and most dangerous pneumonias show no or only slight herpetic eruption, while the most marked herpes usually occurs in the mild cases." I would warn against placing any reliance upon the herpes in estimating either the outcome or the probable duration of the disease.

In about 90 per cent. of Riehl's cases the vesicles appeared over the distribution of the second and third branches of the trigeminus nerve. In 42 per cent. the eruption was on the red or upon the skin of the upper lip. The next most common sites were the lower lip, the nose, and the angle of the mouth. The figures are as follows:

Upper lip	25
Upper and lower lips	24
Upper lip and angles of mouth	1
Upper lip and nose	7
Upper lip, lower lip, and nose	3
Upper lip, angles of mouth, and nose	2
Upper lip and chin	1
Both lips and chin	1

There is no constant relation between the side affected by the pneumonia and the side affected by the herpes.

Localization of the herpes elsewhere than over the second and third branches of the fifth nerve occur, but are exceptional. The forehead, conjunctiva, ears, tongue, neck, arms, body, legs, sacrum—all of these have been observed.

Riehl gives as the most probable explanation of the frequency of herpes in pneumonia that given originally by Gerhardt. Gerhardt held that the herpes was due to the rapid rise in temperature and the resultant rise in blood pressure, irritating the fibres of the trigeminus or sympathetic in their course through the bony canals by the suddenly widened bloodvessels.

Riehl is apparently not familiar with the work of Howard referred to in the last number of the PROGRESSIVE MEDICINE, in which it is shown that there are anatomical changes in the Gasserian ganglion in the cases of herpes over the fifth and in the spinal ganglion in cases in which the herpes appears over the trunk.

Herpetic eruptions have been observed in cases of pneumococcus, endocarditis, pharyngitis, meningitis, arthritis, peritonitis, and sepsis. They are significant not of croupous pneumonia, but of the pneumococcus infection.

ENDOCARDITIS. Horder and Garrod[1] report a case of pneumococcus ulcerative endocarditis in which the pneumococcus was demonstrated in cultures from the blood during life. The case was treated by antipneumococcus serum without effect. The patient was a man of twenty-six, who, about one month before entrance, had had pain in the left chest and cough. These symptoms passed away and later giddiness, cough, and shortness of breath appeared. At entrance he had a temperature of 102.2°, with an enlarged heart, systolic murmur at apex, and a to-and-fro murmur at the base. The temperature ran a very irregular course, with numerous rigors and sweats. Cultures taken from the blood showed pure cultures of pneumococci. The leukocytes ranged from 16,000 to 24,000. Temperature ranged from normal to 106°. Evidence of embolism of the right popliteal artery developed. Death occurred fourteen days after entrance. The autopsy showed a pneumococcus endocarditis, with infarcts in right popliteal artery and in the spleen.

I have[2] reviewed the cases of pneumococcus endocarditis reported to date and add 3 personal observations. The cases number 132. The 3 personal cases presented the usual clinical picture of an acute endocarditis, one preceding and the others following an acute pneumonia. In all the pneumococci were demonstrated clinically in the blood. Two of the patients recovered, both with mitral lesions. The third case died and the diagnosis was confirmed by autopsy. The frequency with which pneumonia is complicated by endocarditis, as indicated by the compiled statistics, is about 1 per cent. of all cases and 5 per cent. of the fatal cases. In most of these cases the endocarditis is due to the pneumococcus, there being only a few instances in which other bacteria acted as the cause. It also becomes clear that this organism causes a much higher proportion of the cases of acute endocarditis than might be supposed, something like 25 per cent. of cases being due to it.

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[1] Lancet, 1904, i. p. 1561.

[2] American Journal of Medical Sciences, November, 1904.

The pneumococcus may cause endocarditis of any intensity, the cases ranging from small excrescences to massive polypoid vegetations; ulceration and perforation of the valves is, however, less common than in the cases due to the staphylococcus or streptococcus. While this variation in intensity is seen, about three-fourths of the cases are of the type usually characterized as malignant. The endocarditis usually affects the left valves of the heart, but involvement of the tricuspid and pulmonary valves occurs about four times as often as it does with endocarditis in general. Why this should be is pure speculation, but it may easily be due to the fact that in this disease the right heart is forced to do an excessive amount of work and that the resulting strain upon the valves may render them more susceptible to infection. Another fact about the distribution of this form of endocarditis, which is of interest, is that the aortic valves are much more frequently involved than the mitral and that the pneumococcus attacks the basal valves about twice as often as do the other bacteria which commonly cause endocarditis. The reason for this is not clear, but it may be due in part at least to the fact that the great bulk of the cases are beyond thirty years of age; that is, in that portion of life when the aortic valves are liable to suffer from arterial changes. The influence of age is shown by the fact that while 58 per cent. of all cases of pneumonia occur during the first three decades, only 18 per cent. of the cases of complicating endocarditis are seen during the same period. The fourth, fifth, and sixth decades supply 35 per cent. of the cases of pneumonia and 70 per cent. of the cases of pneumococcus endocarditis. It is possible that changes in the aortic cusps, insufficient to cause any clinical signs, are enough to make it easy for the pneumococci to emplant themselves and cause an endocarditis. In the future all such cases should be examined to see whether or not the valves show any evidences of arteriosclerotic changes. Another interesting fact is that the pneumococcus endocarditis is relatively twice as common in women as in men, but no suggestion as to why this should be is made.

It has been repeatedly stated that infarcts are exceptional in the pneumococcus endocarditis, but as they are found in something like one-half of the cases that statement is obviously incorrect. The endocarditis may develop before, during, or after the pulmonary involvement, but it is also possible for infection of the endocardium to occur without there being at any time any involvement of the lungs.

The clinical picture does not differ from that due to any acute endocarditis, and the true nature of the process is suggested only by its association with pneumonia or by the demonstration of the causal organism in the blood.

There is usually but not always an elevation of temperature, which may follow without any interruption that of the pneumonia, but in a considerable number of the cases there is a short afebrile period, usually lasting but three or four days, intervening. The fever of the endocarditis may last from a few days up to months and it may assume any type, although it is oftenest very irregular and interrupted by chills repeated at irregular intervals.

Subjective symptoms referable to the heart are usually absent except in cases where there is an old heart lesion, in which case they are due to the old rather than to the fresh endocarditis. Physical signs are often lacking, death occurring so shortly that there is no time for them to develop. In such cases the diagnosis is impossible and the endocarditis is often found upon the autopsy table as an entire surprise. An endocarditis should always be suspected in a case of pneumonia which is followed by an irregular temperature not sufficiently accounted for by some other complication, such as an empyema. This is especially true if the patient is a woman and beyond thirty years of age.

The prognosis is extremely grave, not alone because of the endocarditis, but also because of the fact that in some 60 per cent. of the cases there is also a meningitis. So far the records show but one unquestionable recovery. It is probable, however, that recovery is more common than the published cases would lead one to suppose, for it is not an uncommon clinical experience to find well-marked valvular lesions in people who say that they have never had any infectious process other than a pneumonia.

The treatment does not differ from that of any other form of acute endocarditis, and consists mainly of absolute rest in bed, with good food and stimulation as required.

OTITIS MEDIA. Ward[1] draws attention to the occurrence of otitis media as a complication of pneumonia. This may appear either before, during, or subsequent to the pulmonary process, and is especially to be anticipated in cases which have in the past had trouble with the middle ear. In the great majority of the cases the pneumococcus—for it is usually this organism which excites the complication—passes up the Eustachian tube and excites suppuration, but it is possible, though difficult to prove, that the infection may take place through the blood. The otitis occurs more often in children than in adults, for, as Netter pointed out some years ago, the tendency in children is for the pneumococcus to migrate upward from the pharynx, while in adults the tendency is to migrate downward.

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[1] Medical News, April 16, 1904.

Another fact to which attention was drawn in the 1904 number of PROGRESSIVE MEDICINE is that pneumococcus otitis media may occur without there being at any time any changes in the lungs. The number of these cases is doubtless greater than is at present supposed, and the true frequency of them can be learned only by a systematic bacteriological examination of the pus in all cases. This complication is a serious one, not alone because of its ultimate effects upon the hearing, but because of the danger of extension from the middle ear to the meninges.

TREATMENT. An article by Thompson[1] upon the treatment of pneumonia contains so much of good sense that it deserves some comment. Much of it I am willing to assent to, particularly to his contention that there can be no fixed plan of treatment. Each case must be treated on its merits, and many of them are best treated by being left entirely alone. Thompson advocates the use of aconite during the first twenty-four to thirty-six hours in sthenic cases with full, bounding pulse and evidences of marked toxæmia, and does not approve of venesection. My personal opinion is that exactly the opposite is correct. So far as I have been able to see, the aconite is quite useless and venesection in properly selected cases is most useful.

The essential factor in the control of the vascular system is to maintain a proper balance between the heart and bloodvessels, and to do this requires now one drug and now another, and the dosage must be constantly varied according to the demands. Overstimulation is as bad as, and far more common than, understimulation.

The temperature requires far less attention than is commonly given to it. When the temperature reaches 103° a cool alcohol sponge at intervals is grateful to the patient and therefore beneficial, but no active measures are required unless the temperature reaches 105°, when the cold pack should be resorted to.

During the past two or three decades there has been a constant succession of remedies advanced as so-called "specifics" for pneumonia, but their very number is proof that their alleged value has not been recognized by the profession at large, and the literature of the subject affords instructive if not encouraging testimony of their futility. Thompson also expresses his conviction that the so-called abortive methods of treatment are failures, and with him most, I may say all, experienced observers agree. As to the use of alcohol, it is given far less generally than formerly, but is useful in patients with feeble, dicrotic pulse, dry tongue, and profound asthenia. Its use is indicated, even demanded, in alcoholic patients, and it is often given with benefit to others. Thompson disapproves of the routine use of cough mixtures, and with him I most heartily agree. They accomplish nothing, but disturb the stomach and interfere with the assimilation of food, stimulants, and medicine.

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[1] Journal of the American Medical Association, March 19, 1904.

Gastrointestinal disorders must be guarded against, both because any distention of the intestine mechanically hinders the breathing and there is also more or less intoxication from absorption. When tympanites develops, all milk should be excluded from the diet, being replaced by egg albumen, and various intestinal antiseptics should be used.

Delirium is best controlled by bromides, codeine, or trional. Thompson disapproves of the use of morphine, but, as it has often been useful to me and never harmful, I cannot agree with him.

Rather to my surprise he believes that oxygen is often of distinct service. I agree that if it is to be used it should not be withheld until the patient is in extremes, but a long experience in its use has led to the conviction that the most which can be said for it is that it is harmless. The patient will get all the oxygen he needs if placed in a cool, well-ventilated room, kept free from useless attendants and stoves and lights, which destroy the oxygen and vitiate the air. Hypodermoclysis he advocates and has found useful, while topical applications he finds of no benefit. With both propositions I am in full accord. The only local applications which are of benefit are the ice-bag and the hot-water bag. Sometimes one, sometimes the other, will lessen the pain. They do not, however, shorten or influence the course of the disease.

One other thing should be noted and accentuated, and that is the importance of rest and quiet. One nurse, never more than two, at a time is all that is required, and the other members of the family should be absolutely excluded. There should be several periods of two or three hours duration during the day in which the patient is left absolutely alone and surrounded by everything and every condition which will induce sleep. More than one patient, and this is true of other diseases as well as of pneumonia, has been killed by too much care. Make certain that they are given a chance to get the sleep they need. It will do them more good than all the drugs in the pharmacopœia.

VENESECTION. During the year a number of articles have appeared favoring venesection in the treatment of pneumonia, and it is to be hoped that they are making converts. The present attitude of the majority of the profession toward this therapeutic agent is as irrational as, though less harmful than, that of our forefathers. Never to bleed is as bad as to bleed always. A free bleeding in a robust individual, before consolidation has taken place, is most valuable, as it is later when the increasing size of the heart and the failing accentuation of the second pulmonary tone indicate that the heart is no longer able to do its work. In these later cases and in those which have developed a pulmonary œdema, venesection is useful, sometimes life-saving, but too much must not be expected of it.

ANTIPNEUMONIC SERUM. Anders[1] has compiled the reports upon the use of antipneumonic serum and finds that in spite of isolated enthusiastic reports the total of results is not encouraging. It is now thirteen years since Klemperer prepared an antipneumonic serum, and during that time a great amount of work has been done by numerous authors, especially by the Italians. A variety of serums have been prepared in several ways, and while the laboratory experiments have given promise of good results the clinical tests have failed to show any value in the serums.

In this connection the statement of Welch[2] seems very pertinent. He affirms that the present stage of progress does not hold out any hope of a protective antitoxin owing to the low vitality of the pneumococcus in artificial inoculation, and, further, that there is absolutely nothing that can be termed specific in the disease.

Another difficulty lies in the fact that in many cases there is a mixed infection, thus complicating the conditions which an antitoxic serum must neutralize. I am of the opinion that this difficulty is easily overestimated and that many cases in which the bacteriologist finds postmortem a multiple infection are nevertheless clinically pure pneumococcus infections. That other organisms may cause clinical pictures closely resembling the pneumococcus pneumoniæ is true and will make the interpretation of results more difficult, but since they can in the great majority of instances be excluded by proper examinations of the blood during life, they should not have much bearing upon this question.

It seems to me that too much attention has been paid to the antitoxic side of this question and too little to the bactericidal aspect. Pneumonia is not a pure intoxication like diphtheria. It is a general infection, and a serum to be successful must not only neutralize the toxin, but must also destroy the bacteria. Anders compiles 535 cases which have received serum, with 85 deaths, a mortality of 18.3 per cent.

Rheumatism. During the year there has appeared some additional evidence in favor of the specificity of the micrococcus rheumaticus discovered by Triboulet. As was pointed out last year, this organism is strongly favored as the specific cause of acute articular rheumatism by an increasing number of observers, especially by French and English workers. On the other hand, a number of careful clinicians, notably those in connection with the Pribram Clinic in Prague and the Johns Hopkins Clinic in this country, have failed to find the organism. Personally I am impressed by the work done, but am still inclined to the opinion that rheumatism is a modified sepsis, "a faint mirror image of pyæmia," as Sahli puts it. No one who has access to large amounts of clinical material can have failed to see cases which show every gradation from the frankest kind of sepsis to the most typical acute articular rheumatism, and including in the series the various forms of primary purpura, the scurvy, morbus maculosus Werlhofii, purpura rheumatica, and purpura simplex. The dividing lines between these various forms of purpura, sepsis, and acute rheumatism are so slight that one cannot but suspect that they are merely varying manifestations of the same process. Such impressions, however, cannot weigh against direct evidence. It remains for the future to determine whether they are varying effects of one agent or are due to specific organisms.

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[1] Journal of American Medical Association, 1904, xi., 1777.

[2] Ibid., April, 1904.

Lewis and Longcope,[1] after reviewing the work of Wasserman, Triboulet, Poynton and Paine, Walker and Beaton, to which reference was made in the last article upon rheumatism in PROGRESSIVE MEDICINE, report a case of rheumatism, endocarditis, and chorea, in which they obtained from the blood during life a diplostreptococcus. This organism was moderately virulent for rabbits when injected intravenously, and gave rise to multiple arthritis, which is rarely fatal unless, as in one case, it is complicated by an acute vegetative endocarditis. The joint symptoms usually appear after an incubation period of from four to nine days.

Morphologically and biologically the organism cannot be certainly distinguished from the usual variety of streptococcus pyogenes. It grows fairly well in filtered twenty-four-hour bouillon cultures, but so, occasionally, do streptococci from other sources. Like Walker, they were able to obtain formic acid from the cultures on bouillon. The most striking peculiarity of this organism was the regularity with which it caused changes in the joints, heart, and serous membranes of the animals experimented on. The reporters believe that the organism found by them is the one described by Wasserman, Triboulet, and others, and their work must be looked upon as strengthening the claim that the micrococcus rheumaticus is the specific organism of rheumatism.

Another American article upon the etiology of rheumatism may be mentioned as an example of the persistence with which some minds cling to old ideas long after they have been almost universally abandoned. As already stated, there is still much room for argument over the question of the causal organisms of this disease; but that rheumatism is an infection, specific or otherwise, is now believed by most authorities.

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[1] American Journal of Medical Sciences, 1904, p. 603.

Winters'[1] article, in which he expresses the opinion that "rheumatism is caused by non-neutralized acid products of proteid metabolism," is a surprise. I think that most will agree that there is no sound basis for such an opinion, and that the sooner work along that line is abandoned and replaced by study of the infectious nature of the disease, the quicker the truth will be learned.

In the 1903 volume of PROGRESSIVE MEDICINE attention was drawn to some work by Menzer, in Halle, upon the etiology and treatment of rheumatism. Menzer is inclined to the opinion that the micro-organism of rheumatism is a streptococcus, probably not a specific one, which obtains entrance through the tonsils. He has prepared a serum from streptococci obtained from the throats of rheumatic patients, without, however, increasing their virulence by passage through animals. In his original communication in May of 1902 he could not report much in the way of results, but held that the serum caused a specific reaction with temperature, greater pain and swelling of the joints, and an occasional skin eruption. In August, 1904, he made a report of progress, paying especial attention to the following questions:

1. Does the treatment give a longer protection from relapse of the rheumatism?

2. In what way is the occurrence of valvular heart lesions affected?

He arranges his cases in different groups. The *first* consisted of 29 cases of the first attack of acute rheumatism, all beginning treatment within the first thirty days. The average duration in these cases was forty-six days. The *second* group consisted of 5 cases of the first attack of rheumatism, but entering later than the thirtieth day, on an average the forty-fourth day. These cases recovered in an average time of fifty-one days. The *third* group contains 13 cases which had had numerous attacks of rheumatism, and they recovered in an average period of fifty-three days. Of these 47 cases 43 were completely cured, 1 almost so, and 3 cured except for some slight stiffness.

The results were still better in the cases of chronic rheumatism; thus, in 9 cases which had lasted an average of five months 7 were cured, and 2 so much improved that they could return to work after treatment for an average of fifty-eight days. Of 2 other cases with polyneuritis, 1 was cured and the other improved Of 11 cases in which the disease had lasted for an average of two and a half years, in spite of the prolonged use of salicylates and other things, 5 were cured after one hundred and thirteen days of treatment, 2 were much improved, and 4 only partially so. Two cases of chorea, lasting about two and a half months, were treated and both recovered in two months.

So far as the permanence of the recovery is concerned not much can be said, for the longest period of observation is two years. Of the 47 acute cases 25 have been followed, and but 1 of them has had a relapse; of 11 chronic cases 9 have been well for a year, the other 2 could not be found.

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[1] Medical Record, 1904, 1., 41.

Menzer claims that the serum does not prevent an endocarditis, and rather favors recovery from it; but one cannot but question the accuracy of observation when it is stated that 23 of 47 showed an endocarditis, and that in only 2 of these did there remain a valvular lesion distinct enough to admit of positive diagnosis.

Menzer recognizes as contraindications to treatment pericarditis or pleurisy with large effusions, chronic endocarditis with stenosis of the orifices, and great debility as the result of prolonged chronic rheumatism. People of advanced years and those with arteriosclerosis should not receive the serum. Menzer draws these conclusions:

1. The serum may cause recovery or at least improvement in chronic cases.

2. Recovery from acute rheumatism is in general favored by the serum, and the chances of recovery from a complicating endocarditis are materially greater.

3. The dangers of relapse appear to be lessened, and even old cases remain for a longer time well or at least much better.

Sinnhuber in *Charité-Annalen*, 1904, makes a report upon the use of the Menzer serum in the Kraus Clinic, and in general agrees with Menzer's conclusions. He recommends the use of the serum, especially in subacute and chronic cases, but warns against its use in the acute cases and in cases of stenosis of the cardiac orifices. Menzer agrees with the latter limitations, but thinks that the severe acute cases should receive the serum.

This serum is comparable to the Moser scarlet-fever serum, being prepared in much the same way and exposed to the same objections. It cannot be looked upon as a specific serum with a specific action against some one organism, for not one but several allied bacteria are used in its preparation. One cannot oppose its use if the results are distinctly encouraging, but so far as they are reported by Menzer they are not particularly encouraging, and are indeed no improvement upon the results commonly obtained by the methods usually employed in the treatment of this disease.

Acute articular rheumatism is in general very responsive to the salicylates when they are properly given. So far as my personal observation goes, they are not usually given as they should be. They should be pushed to intoxication in the shortest possible time, and 5 to 6 drachms of the salicylate of soda or the aspirin, together with thrice that amount of the bicarbonate of soda, should be given within twelve hours. From then on the dosage should be 15 grains of each every four hours. Given in these large doses the effect is prompt. It is only rarely that a patient is found whose stomach will not stand this dosage, and the existence of a cardiac lesion is not a contraindication to their use. It must be admitted that the desired results are not always obtained, and it is possible that the Menzer serum may prove useful in such cases.

Among the unusual complications of rheumatism one must include *jaundice*. The amount of information usually included in the text-books upon this point is so limited that the article of Gaussel is quoted.

Gaussel[1] publishes a review of the literature of jaundice in connection with rheumatism. This is a rare complication of this extremely polymorphous disease, and yet its literature extends back to the time of Graves. Visceral manifestations of rheumatism are not uncommon, but they are usually confined to the serous membranes. The only mucous membrane frequently mentioned in connection with rheumatism is that of the tonsils. Pharyngitis and tonsillitis are so common that many authors regard them as the infection atria of acute articular rheumatism. Gastrointestinal catarrhs are also, but much less frequently, described, and there are scattered here and there reports of attacks of appendicitis in connection with rheumatism. Jaundice has been much less frequently noted, but has been described by Frank, Skoda, Widal, Pribram, and others. The pathogenesis of the icterus is obscure, as is that seen with pneumonia. Congestion of the liver, angiocholitis, duodenitis, alterations in the character of the bile, and the use of the salicylates are examples of the explanations offered.

The icterus may proceed, accompany, or follow the arthritis. The intensity varies; the feces may or may not be acholic, according as the ductus choledochus is obstructed or not. The duration varies, but in general it is not long.

The symptoms resulting from the jaundice itself do not differ from those of jaundice of any other cause, nor does its treatment differ.

Scarlet Fever. The work of Aaser, Millard, Lauder, and others is bringing out a fact of major importance in the care of scarlet fever, namely, that cases of scarlet fever may be a source of danger to each other. This idea appeals to one the more strongly because of the growing belief that while scarlet fever is not due to the streptococcus, a large part of the complications are. This naturally suggests the advisability of separating the complicated cases from the uncomplicated, a plan which is now being followed in several infectious hospitals.

Lauder has instituted in Southampton a new system of isolation and discharge of scarlet-fever patients. Mild and convalescent cases are segregated from the acute and complicated. As a result of this the number of complicated cases have been reduced. At the end of the third week cases free from complications are isolated in disinfected quarters, are bathed frequently, are given daily nasopharyngeal douches, and are discharged at the end of the fourth week, irrespective of the desquamation. Of 325 cases discharged during 1903, 33 were free from peeling and complications, and these caused no return cases; 204 were peeling, but without complications, and only 2 of them caused other cases; 88 were complicated, and 5 of these caused other cases. The 204 cases were returned to 180 houses containing 744 persons who had never had scarlet fever, and inasmuch as only 2 cases resulted one must conclude that the desquamation has but little infective power, if indeed it has any.

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[1] Archives générales de médecine, 1904, p. 1432.

Of the 5 complicated cases which caused others, all had had nasal or aural discharges and in some of them the discharge returned after leaving the hospital. All of these cases had ceased to peel before discharge from the hospital.

This experience is like that of Millard, who discharged 190 cases before the desquamation ceased, and only 5 of these caused other cases. Of these 5, 4 had a nasal discharge and 1 a running sore behind the ear.

The conclusion from this report would seem to be that it is not the scales which are infectious, but the discharges from the nose and ears of complicated cases. The separation of the mild and uncomplicated cases from the severe and complicated ones appeals to me as highly desirable, but I believe that until we know the infective agent of this most frightful disease and are certain that it is not attached to the scales, we had better make our mistakes on the safe side and isolate the scarlet-fever convalescents until desquamation has ceased.

The figures quoted above lead one to the same conclusion, for 33 cases which had finished desquamation caused no other cases, while infection did result, though in very small numbers, from uncomplicated cases still desquamating. I believe fully that the profession is remiss in this respect, dismissing cases from quarantine before the slow and prolonged scaling is finished. So little is sacrificed in carrying out this precaution and so much is risked by neglecting it, that it is certainly wrong to change the current plan until it is proven that the scales are not infectious.

Berg[1] has an interesting article upon the course of the fever in measles and scarlet fever, to which partial reference was made in the paragraphs upon measles. He objects to the customary division of these diseases into the three stages of invasion, eruption, and desquamation, and suggests that this be replaced by a division into the stages of eruption, defervescence, and desquamation. The period covered by the current term of invasion he would include in the eruptive stage under the name of enanthematic period. This has reference to the changes in the mucous membrane which precede the appearance of the cutaneous eruption, and includes the conjunctivitis, rhinitis, and the Koplik spots of measles, and the pharyngitis, tonsillitis, and the changes in the tongue of scarlet fever.

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[1] Medical Record, 1904, ii. p. 1.

Between the periods of defervescence and desquamation there are several days during which the skin looks quite normal in scarlet fever and nearly so in measles. The course of the temperature in measles has already been described. That in scarlet fever is much less complicated. During the development of the enanthemata and synchronous with the vomiting and the sore throat the temperature reaches a high degree, often the highest point attained at any time in the course. The exanthem appears promptly, often within six to eight hours, and generally within the first day or two. During the period while the eruption is spreading the temperature remains high, often maintaining its highest point for three or four days. The first slight decline is noticed when the eruption reaches the legs, and once begun the temperature continues to fall by lysis, reaching the normal in from five to eight days.

As has been previously noted, the year has seen an unusual number of articles upon the bearing of acute infections upon the causation of chronic cardiovascular changes and upon the acute cardiac changes of the same cause. One of the best of these is one in which Schmaltz[1] draws attention to the *cardiac changes in scarlet fever*, a subject which has heretofore received but little attention, strikingly little when compared with the amount of study given to the heart phenomena of diphtheria. This is largely because the clinical picture is not so striking. Formerly the symptoms were referred entirely to a complicating endocarditis, and Romberg was the first to draw attention to the fact that the heart muscle as well as the endocardium could be affected by this infection. Schmaltz leaves out of consideration all cases in which the cardiac complication is associated with either sepsis or nephritis, and bases his report upon 191 clinical cases. Among these no less than 35 per cent. showed abnormal symptoms from their circulatory apparatus. The frequency of this complication varies in different epidemics as do all other complications; for example, in 70 consecutive cases of which only 1 died, 38 showed cardiac disturbances.

Attention has been repeatedly drawn to the fact that marked tachycardia, 150 to 160 in children and 120 to 140 in adults, occurs commonly in the first febrile period of the disease, and that such tachycardia is not usually of serious moment. As a rule, the pulse rate falls rapidly to or often even below the normal when the temperature falls, a pulse of 55 being no unusual observation. Sometimes the fall is more gradual and often the pulse is very labile for some time, showing variation of 20 or more in the minute. In still other cases the pulse remains rapid even though the temperature becomes normal.

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[1] Münchener med. Wochenschrift, 1904, p. 1417.

In some cases the pulse later becomes rapid, and when this is extreme one can say that a disease of the heart certainly exists. Systolic murmurs are frequently heard over the heart and are usually not seriously considered, being regarded as mere febrile phenomena. They may appear as early as the first day and later either disappear or continue for a long time. More frequently they appear at the end of the first or during the second or third week. Frequently one finds also an accentuation of the second pulmonary tone. The cardiac dulness may remain unchanged, but often it is enlarged to the left, and less frequently to the right and upward. Romberg held that cardiac dilatation occurred only during the febrile period, but Schmaltz has seen it much more frequently late than early.

Arrhythmia is frequently noted, but may be absent even in severe cases. The subjective disturbances are minimal and consist only of slight palpitation, and may be moderate dyspnœa. The severe precordial distress, the pain, and vomiting prominent in the cardiac complication of diphtheria are conspicuously absent. There is no relation between the severity of the scarlet fever and the liability to cardiac complications, and also none between the so-called scarlet-fever rheumatism and these complications. In 23 cases of such rheumatism there were 10 of cardiac changes, and in nearly 70 with heart symptoms there were none with joint changes. The presence of some pre-existing heart lesion apparently has no influence, 17 of 26 such cases showing no evidences of cardiac involvement. Usually in the course of a longer or shorter time the murmur, the accentuation of the second pulmonary tone, and the cardiac dilatation disappear, but in 29 cases which left the hospital with cardiac symptoms, and which were examined after periods of varying length, 18 showed changes in the heart, and of these 16 showed the essential signs of mitral insufficiency—*i. e.*, an enlargement of the heart to the right, an accentuation of the second pulmonary tone, and a systolic murmur.

In 13 cases of Schmaltz and 20 collected at his request by Schmorl, only 3 showed an endocarditis. Schmaltz believes that the essential change in these cases is in the myocardium, that the leaking of the mitral valve is for a long time due to the myocarditis only, and that later, in some way which is not satisfactorily explained, the valves become altered.

The practical lesson from this report is to keep the scarlet-fever cases under careful observation for several weeks, and to note every, even minimal, disturbance. Schmaltz has found digitalis useless here, as he has with the heart of diphtheria, and recommends the local application of the ice-bag to the cardiac region.

A word may be inserted here in regard to the value of the *ice-bag* in combating the cardiac changes in all of the acute infections. These changes are far more frequent than is generally appreciated, and while their frequency is by no means the same in all the acute infections, they are common enough in them all. As a general thing, when alterations in the rhythm of the heart or marked tachycardia or bradycardia appear, resort is at once taken to the active cardiac stimulants, disregarding the fact that many of them would be better under the continuous use of the ice-bag applied to the præcordium. I find myself in full accord with Schmaltz's statement that in these cases digitalis is often useless and the ice-bag highly valuable.

Last year reference was made to the use of *urotropin* and preparations of that sort in the prevention of *nephritis* as a complication of scarlet fever. Personal experience has lent additional confidence, and the experience reported by others will lead to an extension of the practice. Buttersack[1] reports his personal experience with 10 cases of scarlet fever, occurring in an epidemic characterized by the great number of cases of complicating nephritis. He employed urotropin in all these and saw no nephritis. Ten cases is, to be sure, a small number, and this fact would be without significance were it not that they were part of an epidemic characterized as described. Last year considerable space was given to Escherich's report upon his experience with Moser's polyvalent *serum* in the treatment of scarlet fever. During the year no additional report has appeared from Vienna, but, in a lecture delivered by Escherich before the Chicago Medical Society this fall, he expressed increased confidence in its value, increasing experience making its claims on our attention stronger. It is to be hoped that additional data will appear soon, and still more is it to be hoped that provision will soon be made for a more general use of the serum. It seems that there are many difficulties in the way of its manufacture, and that many failures must be endured before success is attained. Even in Vienna Moser is having trouble in finding horses which yield a potent serum, and much time must be expended before it can be known whether a given horse is good for anything or not.

Some additional data is supplied by Bokav,[2] who reports his personal experience with the Moser polyvalent scarlet-fever serum. He selected 12 of the severest cases from 46, giving from 100 to 260 c.c. serum. After the injection the general condition improved within twenty-four hours, especially striking being the rapid disappearance of cerebral symptoms, unconsciousness or delirium being replaced by normal mental activity.

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[1] Deutsche Arch. klin. Med., lxxx. p. 356.

[2] Deutsche med. Wochenschrift, 1904, p. 6.

The rash faded rapidly. The temperature within twenty-four hours fell from 0.9° C. to 3.4° C., the average in the 10 cured cases being 2.1° C. In 5 cases the temperature rose for twenty-four hours to fall in the next twenty-four. In 3 cases the fall was really a crisis and the temperature did not go up again. No collapse occurred in these cases. Parallel with the decrease in the temperature was its fall in the pulse rate, with improvement in its quality.

The changes in the throat extended less and less rapidly.

Nephritis occurred in 2 cases, 1 severe and 1 mild; both recovered.

Arthralgia was noted in a few cases.

Otitis media occurred in a few cases, but was never severe. No injurious effects from serum was observed. The sudden introduction of so much animal serum had no bad effects, except in one instance when albuminuria occurred, and lasted but a very short time. Serum exanthemata was noted in 7 cases, occurring on the sixth, seventh, eighth, ninth, and sixteenth days, and once after four weeks.

Smallpox. Little new has been added to our knowledge of this disease. The discovery of a protozoan by Councilman as the possible cause of the disease has had no confirmation either by himself or by others. One must look with more than usual suspicion upon this suggestion, for it is in violation of our experience in other infections. All of the other diseases such as malaria, which are due to protozoa, require an intermediate host and are not contagious as smallpox certainly is. This objection to Councilman's suggestion, while purely a theoretical one, still appears to be a strong one. It holds equally well for the suggestion that scarlet fever is due to a protozoa.

An article by Mackenzie[1] is interesting and worthy of note because of the constantly recurring statement that vaccination has a deleterious influence upon the health. He carefully followed the subsequent history of 1000 vaccinated and of the same number of unvaccinated children, with the result tabled below:

	1000 Vaccinated.	1000 Unvaccinated.
Convulsions	2.83	10.67
Meningitis and hydrocephalus	9.96	10.78
Pneumonia and bronchitis	36.83	39.67
Marasmus and tabes mesentericus	5.66	46.78
Laryngitis and whooping-cough	5.66	7.19
Intestinal catarrh	16.16	35.59
Measles	4.25	
Heart disease	...	7.19
Erysipelas	1.46	

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[1] British Medical Journal, 1903, xi. p. 349.

This series is too short to reach any final conclusion, but it shows in figures, something perfectly well known to the profession, that vaccination does not lessen the health and resistance of the child to pay for the immunity to smallpox which it confers. It is probable that there is really no difference in the mortality from the various diseases quoted in the table among the vaccinated and the unvaccinated. The higher figures shown throughout in the table are probably due to the fact that there is a widespread objection to vaccinating children in poor condition. The objection is reasonable, but may easily be carried too far. If the child is actively ill the vaccination should be deferred, but if only a weakling vaccination should be performed. The truth of this was well shown during the past few months by a case in Chicago. The child in question was an invalid, seeing no one but the members of her own family, and confined constantly to the house. Because of this it was thought unnecessary to vaccinate the child. Although thus absolutely protected from all direct exposure, the child, nevertheless, acquired the disease, fortunately in a mild form.

Tetanus. Compared with last year practically nothing has appeared upon this disease. An occasional article recounting some single case, but nothing of extent or particular consequence. There is noted a growing tendency to apply whatever remedy is employed directly to the nervous tissues, either by means of intraspinal or by intraneural injections.

The *Journal of the American Association*, 1904, ii. p. 667, published its annual article upon the Fourth of July tetanus, and shows a most encouraging result from its campaign of education. In 1903 the report covered 415 cases resulting from these injuries, while this year the number is reduced to 105. This remarkable decrease is due to a variety of factors, in part to the lessened sale of the toy pistol and giant cracker, and in part to the better treatment of the wounds. The profession realizes now that these injuries, though apparently insignificant, really require very careful attention and a prophylactic dose of the tetanus antitoxin.

Tuberculosis. As always, this subject has been most extensively treated; an immense amount has been added to the already colossal literature, and yet it must be admitted that no material progress has been made. Many of the articles have been purely theoretical discussions of disputed points, without experimental or clinical basis for the opinions held.

Continued and increased effort has been made to educate the general public to the important part which it must take in the stamping out of this disease. So widely have the popular articles upon tuberculosis been circulated that any one who does not now know of the nature of the disease, the importance of the care of the sputum, the importance of early diagnosis, and the good results from proper treatment is deliberately ignorant. Confidence in the out-door life as a means of treatment is increasing, and the public, like the profession, is growing to more and more realize that migration to other climes is not so necessary as had been supposed. An increasing number of tent camps is being built, and all are reporting favorable results. One of the most successful has been established in the town of Ottawa under the care of Dr. Pettit and backed by the Illinois State Medical Society. The primary purpose of this colony is to demonstrate to the State authorities that tuberculosis is curable in Illinois, and thus lead to the establishment of public institutions for the care of these unfortunates. The results so far obtained have been most encouraging and it seems reasonable to hope that the evidence accumulated and accumulating, backed by the growing public interest and educated public opinion, will lead the Legislature to make the needed appropriations.

The cure of tuberculous patients in the vicinity of their own homes has other than mere economical advantages. All practitioners realize from their personal observations that it is not safe for one who has apparently completely recovered from a pulmonary tuberculosis to return from Colorado, California, or other health resorts to the place in which the infection was acquired. The possibility of a relighting of the old process is too great. In other words, the banishment from home is permanent. In contrast with this is the fact that cases which recover at home may safely remain there.

There have been a number of articles upon the measures which the State should adopt for the prevention and control of this disease. Too many of the profession have and still do object to the registration of tuberculous patients, and it must be admitted that there is some force to the points raised by them. All, however, in my opinion, are trivial as compared with the ultimate good which must come to the race by complete knowledge by the authorities of all sources of infections. Isolation of these cases is now admitted to be unnecessary, and life should be made as comfortable and easy for them as possible. They should be protected from all the annoyances which would come to them if the registration lists of tuberculous cases were made public. Such records should be for the health authorities only.

Herman Biggs[1] makes the following suggestions as to the requirements of administrative control of tuberculosis· (1) compulsory notification and registration of all cases; (2) the sputum examinations in all suspicious cases to facilitate early and accurate diagnosis; (3) educational measures, both for the profession and public, on the subject of tuberculosis by circulars, lectures, and the lay press; (4) visitation of consumptives in their homes for the purpose of educating them; (5) the disinfection of rooms which have been occupied by consumptives, and when necessary the renovation of the premises should be required of the landlord; (6) provision should be made for repeated visits, best by trained nurses, to cases in tenements; (7) suitable food should be supplied by the sanitary authorities to all so poor that they cannot provide for themselves; (8) the sanitary authorities should provide three classes of institutions: free dispensaries for ambulatory cases, hospitals for advanced cases, and sanatoria in favorably located country districts for incipient cases; (9) proper sanitary control of all institutions, hospitals, jails, asylums, and the like in which consumptives are confined; (10) enforce regulations forbidding spitting in public places.

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[1] Medical News, February 20, 1904.

There has been a considerable amount of discussion of the modes of infection in tuberculosis, and the following quotation from Lubarsch is made because it seems to be accurate and reasonable, and does not do violence to well-established clinical data by claiming too much for the intestinal tract as an infection atrium. Lubarsch[1] closes a very careful review of the literature upon the modes of infection with tuberculosis as follows:

1. Of all forms of tuberculosis the respiratory organs are much the commonest infection atrium.

2. The progrediente tuberculosis of the lungs occurs in the following ways:

(*a*) The inspired tubercle bacilli in the apical bronchi of the 3 to 7 group excite a tuberculous process which extends through the bronchi to other parts (type of Birch-Hirschfeld-Schmorl).

(*b*) They pass the bronchi into the alveoli, where they excite a tuberculous pneumonic process (type of Laennec-Koch).

(*c*) They pass from the bronchioles into the peribronchial tissue and there excite a tuberculous lymphangitis.

(*d*) They pass the alveoli or bronchi and in the intrapulmonary lymph follicles excite tuberculous foci.

(*e*) They pass the lungs to the gland at the hilus, there excite tuberculosis, and reach the lungs through the blood (type Ribbert), or break through into the bronchi (type Weigert-Hanau) and thus infect the lungs.

(*f*) Lungs infected through the blood from some old focus.

3. In addition to the inhalation tuberculosis is the infection by food, especially in children.

4. A progressive tuberculosis often follows, not the first infection, but starts from an old latent focus because some predisposing factor has come into play.

Another article by Biggs is quoted because it draws attention to a number of points which, though important, are easily overlooked or forgotten. The importance of house infection, which he points out, is one of the strongest reasons for the registration of tuberculous cases, for it is only by such notification of the health boards that they can practice the disinfection, as necessary with tuberculosis as it is with scarlet fever or diphtheria.

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[1] Fortschritte der Medizin, xxii. p. 715.

Biggs, in an article upon the reduction in the death rate from tuberculosis in children under fifteen years of age, expresses the opinion that the frequent recurrence of cases of tuberculosis in the same family in the same and succeeding generations is largely to be explained through house infection, although he is willing to concede a special susceptibility to tuberculous infection as a possible family characteristic.

Young children in the family of a tuberculous patient are more exposed than others. The infant is more constantly breathing the house air; the prevalent habit of kissing children, the practice of mothers tasting the food of children with the spoon used in feeding them, or through the nipple of the nursing bottle, bring opportunities for direct transfer of tubercle bacilli more important than is generally appreciated. When the children get to creeping around, the possibility of inhaling infected dust is given. The dangers of infection of little children outside of the house are not so great as they are later in life.

A table showing the death rate per 1000 population in five-year periods in the city of New York from tuberculous meningitis and pulmonary tuberculosis is condensed as follows: 1883–87, 0.67; 1888–92, 0.49; 1893–97, 0.42; 1898–1903, 0.34.

This shows a very encouraging decrease, due in Biggs' opinion, to the care now taken in New York.

During the year there have been two articles upon the interrelation of the heart and pulmonary tuberculosis, a subject which has been repeatedly discussed since the days of Rokitansky.

Norris[1] has published an interesting article upon the much-discussed relation of heart lesions to tuberculosis, and would seem to have completely destroyed what little was left of the Rokitansky teaching of the inhibitory influence of heart lesions upon tuberculosis. The details have no place here, but the conclusions are sufficiently important to warrant quotation:

1. In view of the frequency with which tuberculosis of the lungs has been found to be associated with valvular heart disease, we are forced to conclude that the latter exerts, if any, but very slight influence upon the former, either as an inhibitive or curative influence, even if satisfactory compensation is maintained. On considering the relative frequency of valvular lesions in general, mitral stenosis does not seem to be

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[1] American Journal of Medical Sciences, 1904, p. 649.

less often coincident with tuberculous disease of the lungs than other varieties of heart lesion.

2. It is doubtful whether smallness of the heart predisposes to pulmonary tuberculosis of the lungs to a greater degree than is explainable by the general systemic underdevelopment and lack of resistance which such individuals often exhibit. It is a fact, however, that small hearts, either as the result of wasting or hypŏplasia, are commonly found at tuberculous autopsies, while large hearts are often encountered in uncomplicated cases.

3. Stenosis of the pulmonary orifice seems to favor development of tuberculosis of the lungs. A very large percentage of these cases die of the latter disease.

4. Arterial and endocardial thickening is a common result of tuberculous intoxication, but it is doubtful whether this process attains a sufficient degree to produce valvular incompetency, as claimed by Teissier.

5. Tuberculous endocarditis and myocarditis, particularly the former, occur with considerable rarity, but pericarditis, especially the chronic forms, very frequently owes its existence to the presence of the tubercle bacillus.

6. Tuberculosis of the aorta is also a finding of considerable rarity; the condition may result in the formation of an aneurysm.

7. The cardiac muscle undergoes various forms of degeneration in pulmonary tuberculosis, fatty and fibroid changes being very common, a fact which explains the signal failure of digitalis and certain other heart stimulants to benefit these cases.

8. Uncomplicated cases of pulmonary tuberculosis often exhibit such striking differences in resistive power and frequently evince such a remarkable tendency toward recovery, even in seemingly hopeless cases, that we should accept only the most absolute evidence as a proof that either the coincidence of another pathological condition or the administration of a special remedy has conferred a benefit upon the patient.

Sequer[1] contradicts the statement generally made that the heart in tuberculosis is atrophic. He examined 276 bodies of tuberculous patients in regard to the size of the heart and found it more or less atrophied in 84 cases, normal in 71, and hypertrophied in 115.

The atrophic hearts were found especially in the young, dying from chronic ulcerative tuberculosis. Tuberculous enteritis has an unquestionable influence in the causation of the atrophy.

Cardiac hypertrophy was found in cases showing emphysema, pulmonary sclerosis, or pleural synechiæ, all of which increase the pressure in the pulmonary artery.

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[1] Thèse de Paris, 1903

Clinically dilatation of the right heart is relatively frequent and manifests itself by important functional disturbances and by physical signs.

The blood pressure is always reduced in tuberculous cases, and this hypotension is an early and important sign of tuberculosis. The fall in pressure increases as the disease advances. The tachycardia and instability of the pulse in tuberculosis have been known for a long time.

Reference has already been made to the increasing confidence of the profession in the use of good air and good food and distrust of the use of drugs except for the relief of definite symptoms. Many, however, are experimenting with new drugs or with old ones used in new ways. The article by Jacobs, quoted below, appeals to one more strongly as a diagnostic than as a therapeutic resource. The intratracheal injections will certainly never become popular, either as a means of diagnosis or treatment, unless time proves them to have a most markedly beneficial effect.

Jacob[1] reports some experimental work and clinical experiments with what he calls *pulmonary infusions* in the diagnosis and treatment of pulmonary tuberculosis. He was led, by a consideration of the many changes and the great dilution to which any drug given by mouth, subcutaneously, or intravenously is subjected before it reached a diseased focus in the lungs, to experiments leading to a more direct introduction of drugs. Upon lower animals previously tracheotomized he found that he could inject large amounts of solutions directly into the bronchi without harm. He then experimented for six months upon five tuberculous cows. The animals were tracheotomized and from 300 to 600 c.c. of various solutions were used. The cows bore such injections twice weekly and some were greatly improved in health, and when they were slaughtered the pulmonary condition was found greatly improved. He used the following solutions: Betol (0.004 per cent.), creosote (0.1 per cent.), tuberculin (0.1 per cent.), methylene blue (0.1 per cent.), and pyoktanin (0.1 per cent.). The tuberculin and the creosote solutions gave the best results, although all except the pyoktanin caused some improvement. The injections caused some rise of temperature, 1.5° to 2° C., but proved to be safe.

When these infusions were given to patients the larynx was first thoroughly cocainized and then the trachea sprayed with a 2.5 per cent. solution of β-eucaine. The solution used for the infusion was tuberculin in water 20 to 30 c.c. The initial dose of tuberculin was ½ mg. This was injected into the right or left bronchus as desired, through a long, soft-rubber tube 5 mm. thick and 45 cm. long. Animal experiments had shown that when the animal is standing the fluid flowed to the most dependent part. The same is, of course, true in man, and if it is desired that the fluid reach the upper part of the lung the patient should lie down.

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[1] Deutsche med. Wochenschrift, 1904, p. 945.

The infusions were given twice weekly and the amount of tuberculin was increased, but so slowly as to avoid any violent reaction, up to 3 to 5 mg.

Jacobs found also that if an individual had a pulmonary tuberculosis an elevation of temperature followed a pulmonary infusion of $\frac{1}{10}$ to $\frac{1}{12}$ the amount of tuberculin required to cause a reaction by hypodermic injection.

This work is interesting and will be carefully followed, and while Jacobs received encouragement from the results in the 5 cases reported, his observations are too few to warrant anything more than encouragement to continue.

Figari[1] makes a preliminary report upon the administration of *tubercle antitoxin* by mouth. He dried the coagula of the blood of immune animals (calf and horse) in part by heat and in part by sulphuric acid *in vacuo* and, pulverizing the resulting mass, gave it to guinea-pigs. In this way he was able to give the blood of these animals, after eighty-five days of the daily administration of 3 grains of the above material, an agglutinating power of 1: 25, while before the blood had no agglutinating power whatever. After this period he gave them a fatal dose of the tuberculin of Maragliano. Half of the animals lived thirty-six hours, while the control animals died in twelve to sixteen hours. The other animals survived.

He employed the same material in one clinical case for eighty days. The patient showed marked improvement, gaining 5.5 kilos (12 lbs.), and his blood, which at first showed an agglutinating power of 1: 10, at the end of the eighty days showed a power of 1: 50. The result is interesting not perhaps so much for its bearing upon tuberculosis as a confirmation of the experiments of others in giving various antitoxins by mouth and thus immunizing animals.

Typhoid. The important subject of the diagnosis of typhoid has received special attention during the year, and particular efforts have been made to facilitate the early diagnosis, not alone to enable one to begin appropriate treatment at the earliest possible moment, but also and particularly to introduce appropriate measures for the proper disinfection of the excreta, both urine and feces.

Last year attention was drawn to an address by Koch upon the importance of recognizing at the earliest possible moment not only those who are actively sick with typhoid, but also those in whose excreta the typhoid bacilli may be found. So far as danger to others is concerned, it does not make any difference whether the person has symptoms of typhoid or not, but Jürgens[2] draws attention again to the fact that typhoid bacilli may be present in the stools, although the individual is not and has not been sick, and that after typhoid fever the bacilli may remain in the intestinal tract for months and years. The demonstration of the typhoid bacilli in the stools can therefore be regarded only as an addition to the evidence favoring a diagnosis of typhoid, but it does not establish the diagnosis and is not to be seriously interpreted unless there is other evidence.

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[1] Berliner klin. Wochenschrift, 1904, p. 56.

[2] Deutsche med. Wochenschrift, 1904, p. 1233.

Much the same may be said of the Widal reaction. The significance of this reaction is not so single as was at first supposed. Great difficulties occur in the interpretation of the reaction at times, and each case must be studied separately.

Jürgens also lays stress upon the fact that it is not yet practicable for the practitioner to make etiological diagnosis at the bedside accurately enough to warrant attempts at separation of the typhoids into different groups. In the laboratory this may be possible, but not yet at the bedside. Even the employment of the Gruber-Widal reaction in practice has been greatly restricted by certain difficulties; so great, indeed, are these that this important test is scarcely employed outside of centres large enough to support bacteriological institutes. The employment of the dried blood according to the suggestion made by Johnson is the only thing which has made it possible to employ the Widal test even in large cities. It is therefore important that the method described in November of last year by Ficker receive mention. Ficker determined that before this test could be employed generally certain qualifications must be fulfilled: (1) something else than living culture of the typhoid bacilli must be used; (2) the specific agglutinable substance must be permanent; (3) it must show no disposition to spontaneous clearing; (4) the reaction must be visible to the naked eye; (5) the method must not require continuous observation over two hours; (6) the method must be modified so as not to require an incubator, and (7) the dilution of the suspected serum must be carried on in the same way in which it is done with the living typhoid bacilli.

Ficker was finally able to prepare such a test fluid containing dead typhoid bacilli. This fluid is permanent if kept cool and in the dark. It is supplied by Merck in pointed test-tubes, one containing 0.8 c.c. and the other 0.9 c.c. of the solution. To these 0.2 and 0.1 c.c. of serum diluted 1:10 with physiological salt solution are respectively added, and after shaking are set to one side and kept at room temperature. In ten to fourteen hours, if the reaction is present, the fluid is cleared and the agglutinable substances are collected in the bottom of the tube.

Since this article there have appeared a number of reports of trials of this modification, and all have agreed that it is a valuable and acurate addition. For example, Skutesky[1] in an extensive report upon the value of the Ficker modification of the Widal reaction and the reaction as originally obtained, concludes "that the Ficker method is entirely worthy of replacing the Widal reaction, and if the results are no better they are at least as certain. According to my experience no reaction speaks as strongly against a diagnosis of typhoid as a positive reaction does for it."

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[1] Zeitschrift für Heilkunde, Abt. F., 1904, p. 252.

Walter[1] reports the successful use of the Ficker modification of the Widal reaction, obtaining positive reaction in all of 12 cases of typhoid in dilutions ranging from 1:150 up to 1:1000. He regards the Ficker method of value to the general practitioner, making it possible for him to use the reaction with dead bacilli and without even a microscope.

Radzikowski[2] makes a favorable report upon the use of the Ficker modification of the Widal, making this test at the same time that he made the Widal as ordinarily conducted. In every case it proved to be reliable and he regards the Ficker method as a true addition to our diagnostic resources.

Our knowledge of the Widal reaction as ordinarily performed has been materially increased by Kreissl, who makes a report on the Widal reaction as observed during the past four years in the Rudolph Hospital in Vienna,[3] covering 381 tests on 306 cases. He employed a dilution of 1:30 in hanging drop and regards clumping after two hours in an incubator as positive. The reaction was positive in 166 cases; in 37 of these the diagnosis was confirmed by autopsy and in 121 by the clinical course.

In 8 cases showing a positive reaction the autopsy proved that typhoid did not exist. Five of these had had typhoid years before, but three of them had given no history and showed no traces of a previous typhoid. This confirms the observations of others that the Widal may occasionally be met in patients suffering from other disease and giving no history of an antecedent typhoid. It has been observed in septicæmia, meningitis, malaria, diabetes, scarlatina, pneumonia, influenza, endocarditis, miliary tuberculosis, tuberculosis of lungs, and tuberculous pleuritis.

Of the 140 cases in which the reaction was negative 132 by their later course confirmed the serum test, but in 8 cases the clinical course justified the diagnosis of typhoid in spite of the negative Widal. One of these died and the autopsy confirmed the diagnosis. This same observation has been made by a number of others.

Thus, in the 306 cases the Widal reaction failed to follow the rule 16 times, but from this should be deducted the 4 cases in which the Widal was positive, and a history of an old typhoid being present we have. (This gives a percentage of failure of but 3.9.)

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[1] Deutsche med. Wochenschrift, 1904, p. 1193.

[2] Wiener klin. Wochenschrift, 1904, p. 119.

[3] Ibid., 1904, p. 276.

Kreissl concludes that a positive reaction speaks very strongly for typhoid, providing typhoid can be excluded from the past history of the patient; a negative reaction does not absolutely exclude typhoid; the reaction is of especial value in the recognition of mild cases; that the reaction is often valuable in the early recognition of typhoid; that there is no parallelism between the severity of the infection and the intensity of the reaction.

Our efforts at early diagnosis may be often aided by the blood cultures. So far this method has not been much employed outside of the hospital, for the practical difficulties in its way in ordinary house practice are very great. Puncture with a needle is always objected to by patients who are not under complete control, and this, which is a great obstacle to the routine employment of blood culture, is not so difficult as the carrying to the bedside for inoculation the flask of bouillon. An article by Rolly, in which he describes a method of overcoming the latter difficulty, is very welcome.

Rolly[1] makes a report upon 50 typhoids in which he made blood cultures on the first day of entrance into the hospital. In 44 of these—*i. e.*, 88 per cent.—the typhoid bacillus was found in varying numbers. The number of colonies in 20 c.c. of blood varied from 1 to 480. There was no evident relation between the severity of the disease and the number of colonies. Rolly is of the impression that the number is dependent rather upon the stage than upon the severity of the disease. Those cases in which the culture was made late there were few colonies and all cultures made after the fever had passed were sterile. In 16 cases the typhoid bacilli were found in the blood before the Widal reaction appeared.

Rolly has tried to devise some means by which the blood cultures can be made in private as well as in hospital practice. He first tried defibrinating the blood in sterile vessels with glass pearls, but this failed because in a few hours the bacteria are destroyed by the undiluted blood. After trial with several other methods he finally found the following satisfactory: He dissolved 5 grams of peptone and 50 grams of grape-sugar in 100 c.c. of water and boiled the solution from five to ten minutes. Twenty c.c. of this fluid were put in a 50 c.c. test-tube and, after sterilization, corked. Twenty c.c. of blood added to this remained fluid for a day, and even after a longer period was suitable for addition to glycerin agar. Typhoid bacilli in such a fluid do not increase nor are they destroyed.

Quadrone[2] reports the finding of the Eberth bacillus in the blood upon the third and fourth day of 2 cases of typhoid with sudden onset. By the twelfth day they had disappeared. The Widal reaction was intense in these cases and appeared the same day the bacilli were first found.

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[1] Journal of Tropical Medicine, 1904, p. 271.

[2] Gazzeta degli ospedali e della cliniche, March 20, 1904, vol. xxv. p. 364.

This case is quoted merely as an illustration of an early diagnosis made by blood cultures several days before a positive diagnosis could have been made by the ordinary clinical methods.

The older methods of diagnosis, methods in which the great majority of cases will lead one quickly to a correct diagnosis, have been very carefully reviewed by Wesener[1] in an article upon the diagnosis and prophylaxis of typhoid based upon 690 cases personally observed by him during the past twelve years in Aachen. The report is valuable, as all reports of large series of cases carefully observed by one man always are, more so by far than much larger series collected from various sources.

Wesener regards the following six symptoms as the important diagnostic evidences of typhoid, and while one will easily agree that they are important there are two others more valuable in my opinion than some listed by him, namely, the leukopenia and the relatively slow pulse during the early weeks of the disease. Wesener's list is:

1. The peculiar fever.
2. The splenic tumor.
3. The characteristic roseola.
4. The diazo reaction.
5. The Gruber-Widal reaction.
6. The demonstration of the typhoid bacilli.

Wesener has found, as most working in hospitals find, that the course of the fever is of but little help in the diagnosis, because the cases usually enter the hospital in the height of the disease after the period of steplike rise. When the case is observed from the onset this course of temperature is highly suggestive.

The splenic tumor was palpable in 508 of the 690 cases—*i. e.*, 73 per cent.—and doubtless this represents less than the true percentage because of the short time that certain of the cases were under observation. The doubtful cases are also excluded, and anyone who has made it a rule to feel for the spleen in all typhoids will realize how easy it is to be uncertain whether or not the spleen is palpable. Wesener does right to disregard the percussion of the spleen. It is too unreliable to be considered.

Unquestionable roseola were present in 399 cases, questionable in 4, and wanting in 105—*i. e.*, they were present in 78.5 per cent. Unfortunately nothing is said of their varying frequency in different years. I have no suggestions to make as to the explanation of the fact, but there is no question that in some years nearly all cases show the roseola, while in others almost none of them do.

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[1] Münch. med. Woch., 1904, p. 993.

The diazo reaction was found 433 times; 20 times no or only a single examination was made, and in 55 the test was absent. Usually these were cases entering late in the disease or dying in a day or two. The reaction was positive in 85.2 per cent. This is rather lower than the results of my personal experience. The diagnostic value of the diazo, however, is negative rather than positive. Its presence does not mean that the case is one of typhoid fever, but its persistent absence makes it about 15 to 1 that it is not typhoid.

The Gruber-Widal has been employed since 1897 upon 209 cases. It was present in 157, doubtful in 18, negative in 34—*i. e.*, it was positive in 75.1 per cent. of the cases. It is probable that this percentage is too low, for in 19 of the 157 cases in which the reaction was positive the first test was negative. In 20 of the 34 negative cases the test was used but once, and it is reasonable to suppose that some of these would have given a positive reaction later had it been possible to repeat the test.

The above symptoms are tabulated as follows, M. standing for splenic tumor, R. for roseola, D. for diazo reaction, and W. for positive Widal:

Symptoms found.	M.R.D.W.	R.D.W.	M.D.W.	M.R.W.	M.R.D.	D.W.	R.W.	M.W.	M.D.	R.D.	M.R.	W.	D.	R.	M.	O.	Not reliable.	Total.
No Widal made,	...	...	...	...	125	...	...	...	17	74	10	...	30	10	4	13	16	299
Widal made,	[illegible]	39	8	2	9	4	5	2	[illegible]	4	1	1	4	2	2	2	[illegible]	209

The most constant symptom is the diazo reaction, but, as already pointed out, its presence is of less significance than its persistent absence. It is unfortunately often present in just those conditions most difficult to differentiate from typhoid fever.

The presence of roseola is the next most constant symptom, and their presence is of greater significance than their absence. They are wanting in a considerable, sometimes a high percentage of the cases, but while they may be present in such diseases as sepsis and miliary tuberculosis, they rarely are.

The diagnostic value of the Gruber-Widal reaction is lessened by the fact that it may fail to appear in typhoid, and has been found by Wesener in malignant endocarditis, influenza, miliary tuberculosis, and sepsis.

An early symptom of typhoid, which has not yet received the general attention its value warrants, is the leukopenia. My personal experience leads me to a high opinion of its value, and it has repeatedly led me to suspect some other infection in cases which, otherwise, I would have unhesitatingly pronounced probable typhoid.

The subject has been carefully studied by Kast and Gütig.[1] There are very few acute infectious diseases which cause a reduction of the number of leukocytes, and of these typhoid is the commonest and most important.

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[1] Deutsche Archiv klin. Med., lxxx. p. 105.

Kast and Gütig base their report upon the examination of 148 typhoid suspects, of which 103 proved to be typhoid. While the great majority of the cases were between the ages of nineteen and twenty-four, the leukopenia is not peculiar to this period of life. The cases were of all grades of severity; 21 of the 103 ended in death, 31 cases were severe, and 53 were mild. The great majority of the counts were made from the sixth to the twentieth day, but the earliest count was on the fourth day.

Counts under 7000 were regarded as diagnostic of typhoid, 7000 to 9000 were looked upon as doubtful, and the count over 9000 was regarded as evidence against the diagnosis of typhoid. Of the 53 mild cases 47 showed counts under 7000, 4 were between 7000 and 9000, and 2 were over 9000. Of the 31 severe cases 30 were under 7000 and 1 was between 7000 and 9000. Of 21 fatal cases 20 were under 7000 and 1 was between 7000 and 9000. Thus of the 103 cases 92.4 per cent. showed a count under 7000, and that too irrespective of any existing complication.

Many authors have reported hyperleukocytoses as appearing when complications such as pneumonia, angina, bronchitis, otitis, phlebitis, and peritonitis develop, but othere have failed to find leukocytosis even when serious complications manifest themselves. Forty of these cases were complicated, and of these 25 were so at time of first count; of this 25 20 showed a count under 7000, 3 between 7000 and 9000, and 2 over 9000—*i. e.*, 80 per cent. of the cases maintained a leukopenia in spite of complications. These complications included pneumonia, peritonitis, and periostitis. In several cases the blood could be counted both before and after complications, but leukocytosis did not develop. In 3 cases of hemorrhage increase in leukocytes once to 29,000 occurred.

Prognostically the leukopenia is not of much value and in a general way a continued high count is favorable, but recovery may occur even after very marked leukopenia. Even marked leukopenia was observed as early as the fourth and fifth day.

The percentage frequency of hypoleukocytosis has been compared by Kühn and Suckstorff with other symptoms, as follows:

Widal, 95 per cent; leukopenia, 90 per cent.; splenic tumor, 86.6 per cent.; diazo, 75 to 85 per cent.; roseola, 69 per cent., and, as regards early diagnosis, they are arranged: Hypoleukocytosis, Widal, roseola, diazo, splenic tumor.

Of Kast and Gütig's 103 cases 14 gave a negative Widal at a time when they showed a leukopenia, and in 9 of these there was neither a splenic tumor nor roseola.

There are a number of other conditions seen with leukopenia, namely, starvation, measles, morbus Banti, anæmia, malaria, tuberculosis, tuberculous meningitis, acute miliary tuberculosis, sepsis, severe pneumonia, but in none is the leukopenia so marked or so constant. The ease with which the sign can be discovered without the use of a laboratory, its early appearance, and its high constancy make it a most important addition to our diagnostic resources. There are still several points which require elucidation, particularly what the relative percentage of the various forms of white blood cells is in the leukopenia of typhoid.

Hoke[1] has had an unusual opportunity to study a question of some interest, namely, whether the bacilli circulating in the blood are excreted in the milk of a mother sick with typhoid. The report is as follows: He was unable to find them. This corresponds to the conclusion reached by Basch and Weleminsky, who performed a series of experiments upon animals, but never found the bacilli in the milk. Hoke found, however, that the agglutinating bodies were excreted in the milk and the Widal reaction was present in the milk even in a dilution 1:200.

The ever-interesting subject of *typhoid in children*, to which reference was made last year, has been considered during 1904 by Adams,[2] who reports a study of 387 cases of typhoid fever treated in the Children's Hospital of the District of Columbia. It is now generally conceded that infants do not possess the immunity to typhoid fever which they were so long credited with, and note is made of this large series of cases less because there is anything new in the report than because it is a large series observed in one hospital and practically by one man.

Sixty-two per cent. of the cases were admitted during the months of July, August, and September. Sex has no influence as a predisposing factor, for 172 cases were boys and 165 were girls.

The influence of age is not perfectly clear from the report, but one may say the cases are less common during the first two years, but from then on age has but little effect.

There were 37 autopsies, in all of which the characteristic lesions were found in the intestines; the spleen was almost invariably enlarged.

The mode of onset does not differ from that in adult cases. Convulsions are infrequent, conspicuously so when one recalls the frequency with which they initiate the infectious diseases in children. Possibly this is due to the fact that the onset is more gradual in this than in the infections common to childhood.

The temperature follows the usual course, but ends by crisis more frequently than one would expect, in 19 cases. This is so greatly at variance with the typical ending that one may be forgiven a suspicion as to the correctness of the diagnosis in certain of these cases, particularly so when no less than 14 of them were seen previous to the days of the Widal and diazo reaction.

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[1] Zentralblatt für innere Medizin, 1904, p. 382.

[2] Archives of Pediatrics, February, 1904.

The Widal reaction was employed constantly since 1896 and was positive in all but a very small proportion of the cases, in 86.8 per cent. of the cases in which it was employed. The diazo reaction, which has been found more constant than the Widal by most observers, was present in but 40 per cent. of the 182 cases in which it was employed. Perforation occurred eleven times, making 3.2 per cent.

The mortality was 14.2 per cent. for the whole series, but each succeeding decade has shown an encouraging reduction: 1872 to 1882, 26 cases, 8 deaths, mortality 30.76 per cent.; 1882 to 1891, 59 cases, 12 deaths, mortality 20.33 per cent.; 1892 to 1903, 252 cases, 28 deaths, mortality 11.1 per cent. Adams believes this reduction due to the increasing employment of hydrotherapeutic measures.

Previous to 1892 hydrotherapy was only irregularly employed. From 1892 to 1898 the treatment was hydrotherapy, antiseptic and antiperiodic. Eighty-eight cases were treated in this way with a mortality of 11.36 per cent. Since 1899 pure hydrotherapy has been employed in 164 cases, with a mortality of 10.97 per cent.

Several of the complications of typhoid have received careful discussion. Probably no one of the acute infections is so prolific of complication as typhoid, and while most of them have in the past received repeated consideration, many have not been extensively reviewed within recent years, that is, during the period in which so many of the older ideas have undergone change or suffered complete abandonment.

Thayer[1] publishes an analysis of 42 cases of *venous thrombosis* observed in the course of typhoid fever: 39 of these were observed in the course of 1463 cases—*i. e.*, 2.6 per cent.; the other 3 entered during or after convalescence from the typhoid; 5 of the 39 cases died, and 2 of these directly as a result of the thrombosis, 1 by pulmonary embolism, and 1 by embolism of the inferior vena cava and right auricle.

The thrombus was in the lower extremity in 42 cases, once in the upper and once in the pulmonary artery, twenty-six times left-sided, five times right-sided, and nine times bilateral.

The femoral vein was the one most often involved, twenty-one times; the popliteal vein five times; veins of the calf five times; the internal saphenous three times; the pulmonary artery once; the pulmonary artery and common iliac once; the axillary vein once.

The commonest time of onset was the third to the sixth week; this period includes 24 of the 42 cases. The clinical picture of thrombosis consists of fever, present in almost all cases and often preceding any of the local symptoms. Chills occur in nearly one-third of the cases, and may precede, accompany, or follow the thrombosis. There may be one or several chills, and a week may elapse after the chill before the thrombosis presents itself. Pain is the first local symptom; it varies in intensity and duration, but is always present. In cases of femoral thrombosis the pain appears along the course of the femoral vein, and in Scarpa's triangle, sometimes in the calf or popliteal space. The onset may be sudden. In case the iliacs are involved the onset may be with sharp abdominal pain.

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[1] Medical News, 1904, p. 637.

Œdema appeared in all of 39 cases. The thrombosis could be felt in 16 of the 39 cases. Leukocytosis was present in 12 of 22 cases examined for it, and the extremes of the count were 24,864 in a case of iliac thrombosis in the third week, and 2700 in one of popliteal thrombosis in the sixth week. In 8 cases the leukocyte count was made on the day of onset and showed numbers ranging from 6000 to 20,000. It should be remembered that the bulk of the cases occurred at a period in which a normal typhoid shows a reduced number of leukocytes.

The subsequent course was followed in 16 cases over periods varying from a few months to twelve years. In the great bulk of these the patients suffered from œdema, cramps, pains, varices, ulcers, and paræsthesias up to the period when last seen. One case of popliteal thrombosis had had no trouble whatever.

No complication is more to be feared than the *intestinal perforation.* The clinical picture resulting from it is now quite clearly outlined, but the ideas of treatment have so modified in the last years that the subject has received renewed attention. During the year several extensive articles have appeared, but only one is selected for review.

Harte and Ashhurst[1] make a report upon 362 laparotomies for intestinal perforation in typhoid or for peritonitis without perforation. In a total of 8881 cases of typhoid perforation was found to occur in 222—*i. e.*, 2.54 per cent. The white race is more disposed to perforation than the colored, and for some curious reason the male and female cases bear the numerical relation of 4 to 1. Age does not have much influence, although the cases after thirty years are rather more numerous than would be expected; 33 per cent. of the cases were over that age. The stage of the disease has much influence, as is natural, considering the pathology: 2 per cent. during the first week, 56.6 per cent. during the second, and 41.2 per cent. during the third.

Tympanites acts as a predisposing cause, and the exciting causes are mainly mechanical; indiscretions in diet, purges, too large or too forcible enemata, sudden movements, and the like.

The perforation is usually single and usually small, rarely being more than one-half inch in diameter, and usually much smaller than this. It is oftenest opposite the mesenteric attachment, and in about three-fourths of the cases is within one foot of the cæcum. It may be in the colon, sometimes in Meckel's diverticulum.

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[1] Annals of Surgery, January, 1904.

The diagnosis is easy in typical cases, but such are exceptional. All the symptoms may be present without perforation, and all may be absent and yet a perforation be found at the autopsy.

Pain is the most valuable symptom, though not pathognomonic. It is usually stabbing in character, and in the right lower quadrant. It may be located in the bladder or penis. It varies greatly in intensity and a very apathetic patient may not complain at all.

Vomiting is not indicative of perforation, but when it occurs for the first time coincidently with pain it is very suggestive.

Sweating and a fall of temperature of 4° to 6° is not uncommon. Muscular rigidity, especially of the right rectus; tenderness, a rapid rise in the pulse rate, and other evidences of shock are also symptoms demanding attention.

The differentiation between perforation and hemorrhage is sometimes difficult, especially so in patients who have had hemorrhages. Pain is usually wanting in cases of hemorrhage. The symptoms of shock are common to both.

Twenty-six per cent. of the cases treated by laparotomy recovered. Death was hastened in but few instances by the operation.

The diagnosis of this complication is often difficult because of the stupor of the patient depriving us of several of the earliest and most suggestive symptoms. In view of this fact I believe that an exploratory laparotomy should be made whenever a diagnosis of perforation is a reasonable one.

All must now agree that there is but one method of treatment, and that is surgical. Medical treatment is a complete failure, and while the result of the surgical operation is not so good as one would desire, this is, at least in part, due to the fact that the operation is often delayed too long. This delay can be avoided by operating whenever the suspicion of a perforation is a reasonable one.

Another possible cause of peritonitis complicating typhoid fever is the *rupture of a suppurating mesenteric gland.* Such a case is recorded by Le Conte.[1] He reports an instance of rupture of a mesenteric gland in typhoid fever. This complication is an extremely rare one, although change in these glands is a constant phenomenon in typhoid. Le Conte concludes that the changes which lead to rupture are not due to the typhoid bacillus, but to the presence of the staphylococcus or streptococcus, or to thrombosis of larger vessels of the mesentery outside of the gland.

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[1] Journal of American Medical Association, 1904, ii. p. 1188.

The clinical picture was that of an intestinal perforation. The case was operated on within six hours after the onset of sudden, very severe abdominal pain. This pain, however, was not the first, for the previous day the patient complained of pain, had a sudden rise of temperature, with abdominal distention, slight rigidity of the right rectus muscle, tenderness, and almost complete disappearance of the liver dulness. At the operation a localized peritonitis was found. The lower part of the ileum was inflamed, covered with lymph, and showing one ulcer which appeared to be about to perforate. This was covered by Lembert sutures. The mesentery at the junction of ileum and cæcum was much thickened and inflamed. One of the ileocæcal glands had broken down and perforated the peritoneal coat. The patient recovered.

Two other cases are mentioned. In each the clinical diagnosis of perforation was made and both died in spite of the operation.

The relation of typhoid fever to affections of the biliary tracts is more important than is generally supposed, the typhoid and paratyphoid bacilli being not infrequently the cause of cholecystitis and gallstones. This subject has in the last year or two received considerable attention. A new fact in this connection is brought out by Blumenthal, namely, that gallstones due to the action of these bacilli may develop in people who give no history of any antecedent typhoid.

Blumenthal[1] reports two cases of *gallstones* in which he was able to demonstrate in one the typhoid and in the other the paratyphoid in the gall-bladder. The cases are noted because neither of the patients gave a history of any disease resembling even remotely typhoid fever. The case in which the typhoid bacillus was found had had several cases of typhoid fever in her family, her husband and brother, but the other case gave no such history of exposure.

The serum of each case reacted to its particular bacillus strongly. The cases show that it is possible for the typhoid and the nearly related paratyphoid bacilli to enter the bile tracts and there excite inflammation without causing the usual intestinal infection and constitutional symptoms, and that the serum of such patients agglutinates the particular bacillus at work.

The appearance of a Widal reaction in case of *icterus* has been noted a number of times, and is important in the bearing which it may have upon the subject just referred to. Articles by Zevi and by Kämmerer review the subject so thoroughly that both are quoted rather freely.

Zevi[2] reports a study of the Widal reaction in icterus. A reaction under this condition has been repeatedly observed.

Koehler found it positive in 6 of 8 cases.

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[1] Münchener med. Wochenschrift, 1904, p. 1641.

[2] Wiener klin. Wochenschrift, 1904, p. 860.

Zupnik found it positive in 7 of 11 cases.

Megele found it once with liver abscess.

Eckardt found it in dilution of 1:1000 in 2 cases of Weil's disease, and once in cholelithiasis 1:100.

Eisenberg and Keller once with lithiasis 1:500 and once in icterus of unspecified cause 1:50.

Langstein and Meerwein once 1:100 with cholelithiasis.

Königstein found no reaction with the bile in 21 cases of icterus, and also failed with the bile of ten normal rabbits.

Kreissl reports 8 cases of icterus all negative in 1:30 dilutions.

Gilbert and Lippman report a study of 30 cases of which 26 gave no reaction.

Steinberg had 7 in 22 cases showing a positive reaction.

Zevi examined the bile of 34 bodies in the Pathological Institute, and found in all a negative reaction. This confirms the experiments of others with the exception of Köhler.

Zevi examined 24 cases of icterus, but found a positive reaction in but 4:1 cystoma ovarii, 1 carcinoma ventriculi with liver metastases and a history of typhoid fever eighteen years before, 1 with atrophic cirrhosis, and 1 of carcinoma of the gall-bladder with stones.

The 4 positive cases gave agglutination of the paratyphoid bacillus as well as of the typhoid, and also a fairly well-marked agglutination of the Flexner dysentery bacillus, and very slight agglutination of the Shiga bacillus.

Kämmerer[1] reports a study of the Widal reaction in the blood of patients showing icterus. It has been generally accepted up to the present that a reaction in dilutions above 1:40 was peculiar in typhoid, but numerous authors have reported this reaction in dilutions beyond this point in cases of icterus, notably Eckart, who has made such reports, observing 8 cases in which reaction occurred with dilutions of 1:100, even 1:1000.

In cases in which there is a mechanical stasis of the bile it would occur to one that the bile itself might be capable of causing the agglutination of the bacilli, and Köhler was able to cause the agglutination sometimes even with dilutions of the bile up to 1:160. He referred the reaction to the taurocholic acid and compared it to the reaction caused by salicylic acid, ammonia, formalin, etc. In cases in which the jaundice is due to changes in the liver cells one might think of some yet unknown change in the blood as the cause of the reaction.

Kämmerer examined 50 cases of icterus to determine the number of cases in which the Widal occurred with higher dilutions than 1:50. He found this but once, in a case of catarrhal icterus, the reaction being positive at 1:75. This patient had never had typhoid fever. In 8 other cases the reaction was positive in dilutions ranging from 1:20 to 1:50. In all the other 41 cases the reaction was wanting in dilutions beyond 1:10. This study has a bearing upon the theory of the Widal, but has no particular bearing upon the clinical significance of the Widal in typhoid because of the great infrequency with which one is called to differentiate typhoid from diseases in which icterus occurs.

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[1] Berliner klin. Wochenschrift, 1904, p. 699.

As an example of the not rare *meningotyphoid* we may quote a case of Achard and Paisseau, particularly as it furnished a striking instance of the great value of the bacteriological methods in the diagnosis of acute infections, and of the folly of placing too much reliance upon one symptom. It is to be regretted that no cultures were taken from the blood as well as from the spleen. In spite of the apparent harmlessness of splenic puncture, the profession has not yet overcome its unwillingness to employ this diagnostic aid, and if this puzzling case could have been as well solved by the blood culture as by the splenic puncture it would be well to know it.

Achard and Paisseau report the case of a boy of eighteen years, who after about three weeks of severe headache, backache, and general malaise, entered the hospital with marked stiffness of the neck, distinct Kernig sign, nocturnal delirium, vomiting, temperature 39.5° to 40° C. Lumbar puncture showed a clear fluid containing many lymphocytes; cultures negative. Three days later roseola and a positive Widal were noted. The next day the spleen was punctured and cultures of Eberth bacilli were obtained. The case ran the ordinary coures of typhoid and recovered.

This case would be described as a meningotyphoid, and the meningeal symptoms would formerly have been attributed to meningismus rather than to meningitis; but to-day it seems likely that very many of the cases formerly regarded as mere meningeal irritations are really meningitis. Lumbar puncture has proven to us that many cases are truly meningitis, even though they end in recovery. Even cases in which the cerebrospinal fluid contains so many white corpuscles as to be milky white and shows the presence of micro-organisms recover. This particular case is noteworthy because the meningeal symptoms, together with the lymphocytosis of the cerebrospinal fluid, would strongly suggest the possibility of a tuberculous meningitis, and one must therefore not be too ready in diagnosing tuberculous meningitis from this combination.

PROGNOSIS. Nothing is more difficult than prognosis, and this is true of acute as of chronic diseases. Because of its great diversity in course and because there is no absolute relation between the severity of the symptoms and the extent of the intestinal lesions, a paper containing suggestions as to the prognosis of typhoid fever is worthy of comment. Sedgwick, in the *Birmingham Medical Review,* February, 1904, reports his experience in 460 cases of typhoid, and draws attention to points which will be of assistance in prognosis. Prognosis in this disease must always be guarded, especially because many complications may appear suddenly and change a mild and apparently favorable case into one which is well-nigh hopeless.

Generally speaking the prognosis is better in children than in adults, for the fever is usually milder and less prolonged. Diarrhœa and tympany are exceptional and the serious complications less common than in older people.

Stout people, no matter what may be the cause of their obesity, are not good subjects for typhoid fever, or any other infection, for that matter. A gradual onset indicates a milder course. Out of 117 cases in which the onset was gradual only 39 ran a severe course. Of 46 which began suddenly, 26 were severe.

High temperatures are generally associated with marked alteration in most of the bodily functions, and especially those of the nervous system. The marked improvement in prognosis in typhoid fever in recent years is undoubtedly due, in a great degree, to the means taken to lower the temperature by hydrotherapeutic measures. Cases in which the functions of the body are but little disturbed by the temperature have a better prognosis than those just mentioned.

The pulse rate is a good indication of the severity of the attack. In cases of moderate severity it is generally a little raised, usually to about 100 beats per minute, but it is by no means uncommon to find a high temperature with a normal or even subnormal pulse rate. Sudden changes in the pulse rate are important guides to threatened complications. Postfebrile bradycardia, even down to 40, is not uncommon, and until the pulse improves the patient should be kept in bed.

In severe cases the tongue becomes dry, brown, and fissured, and such a tongue indicates a severe gastrointestinal inflammation, and such cases are often associated with diarrhœa or hemorrhage.

Meteorism is a grave symptom, for it favors perforation.

Constipation is favorable, while persistent diarrhœa is bad. Of 65 cases with constipation only 2 died, while there were 22 severe cases and 5 deaths in 31 cases with diarrhœa.

Hemorrhage is a serious complication, but death is not often due directly to loss of blood. Hemorrhages during the first few days are not so very bad, but those about the end of the first week are serious. Even worse are those occurring at the end of the third or beginning of the fourth week.

Nervous symptoms occur chiefly in the very severe cases and in alcoholics. They are always of serious import, and the more so the more marked they are.

One must also consider the general character of the epidemic in forming a prognosis. The more severe the general run of cases, the worse becomes the prognosis.

Another aspect of the question of prognosis is taken up by Curschmann,[1] where he discusses the question whether a typhoid fever can end in death within a few days after the first symptom has appeared. Every experienced physician would admit this, as Curschmann says. He first discussed the ambulatory form of typhoid, cases which continue to go about in spite of the fact that they are suffering from an Eberth infection. The factors which make this possible vary. It may be that the infection is mild or that the reaction which the host opposes to the infection is so great that no or only moderate symptoms result.

Many such cases never apply to the physician, while in other cases the physician is led by the mildness of the symptoms to some indifferent diagnosis. Thus, a diagnosis of gastric catarrh, of influenza, of neurasthenia, of anæmia, or of malaria may be made. The frequency of these errors is reduced by the employment of the modern methods of examination, especially the Widal reaction and the culture of the specific organism from the blood.

It is easy to see how such patients are more liable to serious intestinal manifestations than those who are protected. Thus, hemorrhage or perforation may occur in one not previously manifestly ill, and death result in a few days or even hours after the onset of the symptoms.

A perforation may occur at the appendix and the case present itself as an appendicitis.

Curschmann mentions the case of a woman who had been complaining of symptoms, which had been referred to an influenza, for a period of about two weeks. She suddenly began to suffer from most severe dyspnœa, and died within half an hour of pulmonary œdema. The autopsy showed a typhoid fever at the end of the third week, and death due to pulmonary embolism, the source of the embolus being the right venrticle. Another form of typhoid which may cause sudden death is the foudroyant or hyperpyretic form, from which death may occur in a week or even less. Beginning with a single or repeated chill, the temperature rises rapidly and reaches the maximum point in twenty-four to thirty-six hours. It continues with very slight morning remissions. The pulse becomes very rapid and signs of cardiac failure appear early. The patient is delirious from the start and rapidly becomes stupid. The spleen even in the beginning becomes greatly swollen; roseolæ are exceptional. The patient dies from the intensity of the intoxication in a week or less.

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[1] Deutsche med. Wochenschrift, 1904, p. 610.

Sometimes a case which shows this foudroyant, asthenic course will prove to be the ending of an ambulant case.

Another but rarer rapidly fatal form is the hemorrhagic type. Hemorrhage into the skin and from the various internal organs characterize these cases. Curschmann has seen but six examples of this form. Death occurs early.

As might be expected from the general consensus of opinion now prevailing in regard to the treatment of typhoid fever, this aspect of the question has received less discussion than in former years.

Efforts at the development of a specific serum continue, but as yet no definite conclusions can be drawn. Efforts are also being made to develop some form of protective injection, and Smith[1] publishes a careful review of the Wright antityphoid inoculations, describing in detail the methods and results. The conclusions which he draws may be summarized as follows: The antityphoid inoculations (using dead bacilli and their toxins subcutaneously) have a distinct protecting influence, but to obtain the full protection the inoculation should be made, say, two months before the exposure to infection; but even when performed only shortly before exposure the procedure is beneficial. The protection lasts for some years and is in the proportion of 3 to 1, being, therefore, much less than that shown by the vaccination against smallpox. At present its value is not sufficient to warrant general adoption, but is of distinct value where typhoid fever is epidemic, and to those who have much to do with typhoid cases.

Hare[2] again makes an appeal for a more liberal dietary for patients with typhoid fever. Both theoretical considerations of physiological facts and personal experience have convinced him of the utter inadequacy of the pure-milk diet in the treatment of typhoid fever. He gives all patients after the first week of typhoid from one to two soft-boiled eggs a day, in addition to the ordinary allowance of milk, and varies the diet by the use of curds and whey, rice which has been boiled to a pulp, barley, wheat, and oatmeal gruel, and a cup of cornstarch, with vanilla or some other flavoring substance. This diet has led to an almost complete disappearance of the ataxia so often seen during the convalescence of typhoid, and secondary complications like furuncles and bed-sores no longer occur. In employing this diet due allowance must be made for the feeble digestive powers of the patient, and pepsin and hydrochloric acid should be given with the proteid foods, and taka-diastase and pancreatin with the carbohydrates.

Hare further believes that the element for good in the cold baths is not so much the cold as the rubbing or massage which follows their use. This aids the dissipation of the body heat, readjusts the circulation, and exerts on the patient the beneficial effects which follow the use of massage, as seen in the rest-cure treatment of neurasthenia. Equally good results can be obtained if these patients are properly sponged, with friction, instead of being plunged. The sponging does not require moving the patient.

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[1] Journal of Tropical Medicine, 1904, 271.

[2] Therapeutic Gazette, September 15, 1904.

With much of this, one can agree. I believe fully that the milk diet as usually employed may be the source of considerable harm, that the disease can be made much more endurable, and the patient's return to strength hastened by a more generous diet such as Hare outlines, and to which a number of things can be added by a little thought and ingenuity.

I think also that it is possible to carry the cold bath too far, but I believe that it is easier to fail to carry it far enough than to carry it too far. Friction and massage are useful and can be practised as well with a sponge bath as with a plunge. Here as elsewhere one must individualize intelligently, and not attempt to practice by rule of thumb.

Paratyphoid continues to claim much interest in the larger centres and hospitals where the facilities for its study exist. It is to be hoped that the near future will see some means of diagnosis adapted to the uses of the general practitioner, which will enable him to separate the typhoid and paratyphoid cases.

Clemens[1] publishes a careful review of the literature of paratyphoid, and from it the following description of the clinical course is taken: During a prodromal stage of from three to eight days, with symptoms such as occur during the same period of typhoid—headache, epistaxis, nausea, weakness—there often appear catarrhal symptoms from the throat, with swelling sometimes of the cervical glands, to which is sometimes associated swelling of inguinal glands. Conjunctivitis, œdema of the eyelids, and bronchitis also; sometimes herpes; diarrhœa and constipation are about equally common; not rarely severe pain in abdomen. Fever often rises rapidly, may be with chill, to 40° C. Sometimes with a gradual rise and a typical curve, but more frequently the course of the fever is more irregular, intermittent, not rarely ending by crisis, and lasting on average ten to twenty-two days.

Skin roseola are present in 80 per cent., single or multiple, often dark red, not only on abdomen, but also on face and hands; most marked about the twenty-first day; "some dark, macular spots on abdomen;" petechia are also described. Tongue appears as in typhoid.

Nose-bleed is common; bronchitis is not infrequent, but pneumonia is nowhere recorded.

Vomiting sometimes occurs; diarrhœa is often recorded, in 60 per cent. Intestinal hemorrhage occurs in 5 per cent. of cases.

No perforations yet recorded.

Pain in the abdomen, especially upper part, is often noted.

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[1] Deutsche med. Wochenschrift, February 18 and 25, 1904.

Spleen is often enlarged to percussion, sometimes palpable.

Delirium common, apathy, stupor, incontinence of urine and feces.

Albuminuria is common and casts frequent.

Diazo reaction occurs in 30 to 60 per cent. of cases.

Pulse soft, often dicrotic, relatively slow.

Blood shows leukopenia, then lymphocytosis and eosinophilia.

Relapse many times described, shorter, but otherwise like first attack.

Duration of disease twelve to eighty-four days.

Occurs in men more often than women; ages, seven months to sixty years, but great majority between twenty to thirty.

Diagnosis is made by culture from blood or feces and by the reaction of serum to various bacteria.

Conradi[1] reports the history of a patient, an eight-year-old girl, who was taken with fever, vomiting, pain in abdomen, constipation, and sore throat after eight days of prodromal symptoms. Temperature went up gradually, diarrhœa appeared, with roseola and enlarged spleen. Typhoid and paratyphoid bacilli were found in the stools. Patient recovered after an illness of three weeks' duration. The course was that of a typhoid except that the temperature was less regular than usual.

These cases open up new possibilities and further complicate this already too involved subject.

Flatau[2] reports a case of *optic neuritis* appearing in the course of a paratyphoid (typhus B.). In view of the great similarity of the clinical pictures resulting from infections with the typhoid and the paratyphoid, a resemblance so close that differentiation between them can be made only by means of serum tests and cultures, it is interesting to note that even the rare symptoms of typhoid infections occur also with the paratyphoid.

Uhtoft found, among 253 cases of optic neuritis resulting from infection, 17 examples of typhoid fever. This complication usually appears in the second or third week of the disease, and causes more or less impairment of vision, hemorrhages into the retina, and, lastly, partial or complete atrophy of the nerve.

Yellow Fever. While search for the specific organism of this disease continues, the medical world is in practical accord over the manner in which infection of the human being occurs. The value of the work done by the Americans in Havana is now generally admitted, and other places, by employing the methods of stamping out the disease in that city, are meeting with equally gratifying results.

The spread of the disease by the mosquito suggests strongly the possibility that the specific cause of yellow fever is not a bacterium, but a protozoa.

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[1] Deutsche med. Wochenschrift, 1904, p. 1165.

[2] Münchener med. Wochenschrift, 1904, p. 1245.

Guitéras,[1] in a report upon an epidemic of yellow fever at Laredo, Texas, draws some conclusions from his experience which demand attention and legislation. In the first place the results obtained through the efforts to combat the epidemic go to demonstrate that the mosquito (*Stegomyia fasciata*) is the only means of transmission of yellow fever, and that the efforts to destroy the same were productive of much good. Oiling all water containers and deposits of stagnant water completely prevented the reproduction of these mosquitoes. It was also manifest that in order to control an epidemic one must have absolute power to enforce sanitary means. Because the mosquito can become infected only during the first three days of the disease, it is important to secure the earliest possible notification of all cases in order to effectively screen them from the bite of the mosquito. It also became obvious that it is impossible to obtain good results without a mosquito-proof yellow-fever hospital. The difficulties of handling an epidemic are increased when an outbreak occurs on the frontier. Arrangements should, therefore, be entered into by treaty with contiguous foreign countries so that under such circumstances sanitary measures may be carried out jointly by the countries interested for mutual protection.

Whooping-cough.—Mamcalide[2] has made a bacteriological study of the sputum of 82 cases of whooping-cough and finds a bacillus which he calls Bacillus Z. This bacillus was found fifty-six times in the 62 cases in the stained sputum, and grew on agar plates sixty-seven times in 80 cases examined. It was missed altogether in only 5 of the 82 cases. He believes it to be the specific organism.

Experiments upon animals were not successful in causing a picture like whooping-cough. Cultures were then given by injections to three sheep and two horses with the idea of learning whether a specific serum could be produced.

After a prolonged course of such injections a serum was prepared in the way generally employed in obtaining the diphtheria serum. This serum was employed in 89 cases of whooping-cough, of whch 36 were cured and 53 improved only. The recovery in 22 cases took place in from eleven to thirty days, while in 14 it required from thirty-two to fifty days. Eight cases recovered after a single injection made respectively upon the eleventh, thirteenth, fourteenth, nineteenth, twenty-first, twenty-eighth, thirtieth, and forty-second days of the disease. Eighteen cases required two injections and the others received from three to six injections. The effect of the serum is shown in the smaller number of attacks, their lessened intensity, by the lessened vomiting, and by the abbreviation of the course. If the injection is given during the first two weeks of the disease, recovery may be expected in from two to twelve days.

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[1] Journal of American Medical Association, 1904, xi., 115.

[2] Zeitschrift für Hygiene, 1903, xlv. p. 469.

DISEASES OF CHILDREN.

By FLOYD M. CRANDALL, M.D.

Hemorrhagic Disease of the Newborn. The infections of the newborn infant have received considerable study during the past two or three years, and our knowledge of their causation has been considerably increased. This subject, as well as the mortality of early life and its causes, was considered in detail last year.[1] Much study has apparently been devoted during the past year to the hemorrhagic diseases of the newborn. Our knowledge of these diseases has been well presented in a paper by Wollstein.[2] She excludes traumatic hemorrhage and hemophilia, and believes that the cases to be strictly considered as peculiar to the newborn are those of multiple hemorrhages, which occur as morbus maculosus neonatorum, epidemic hæmoglobinuria or Winckel's disease, acute fatty degeneration or Buhl's disease, and syphilis hemorrhagica neonatorum. While much further study is required to determine the exact nature of the underlying condition and the direct etiological action in these cases, as well as the interdependence of the various forms in which the disease manifests itself, our present knowledge of its symptoms, clinical course, and pathological anatomy tend very strongly to prove that the process is one of infection. It seems certain that morbus maculosus, Winckel's disease, and Buhl's disease represent different varieties of the same disease; the difference being one of degree and varying with the condition of the child.

A specific micro-organism in these cases has not yet been found. The following bacteria have been cultivated from the heart's blood and viscera after death: staphylococcus pyogenes albus, staphylococcus pyogenes aureus, streptococcus pyogenes, a diplococcus resembling the diplococcus pneumoniæ, bacillus pyocyaneus, bacillus hemorrhagicus of Kolb, bacillus enteritidis of Gaertner, bacillus coli communis, and bacilli resembling that organism. The difficult technique of making blood cultures during life in young infants proves a grave and frequent obstacle to the complete and satisfactory study of the disease. Nevertheless, such cultures have been successfully made by several observers, with results similar to those obtained at autopsy. The bacteria almost invariably found have been the pyogenic cocci and the colon bacilli. Morphological study of the blood has not thrown any light upon the subject. The source of infection and its portal of entrance remain obscure in some cases, but in the larger number they are demonstrable.

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[1] PROGRESSIVE MEDICINE, March 1904, p. 217.

[2] Archives of Pediatrics, September, 1904.

That hemorrhages do not occur in every case of sepsis in the newborn child is no argument against their sometimes occurring in cases of greater severity or increased vulnerability on the part of the child. The mouth, the gastrointestinal tract, and the umbilicus are the main points of entrance for the infection. The umbilicus does not necessarily show any inflammatory lesion as a result. However pus may be found in one or both hypogastric vessels within the abdominal cavity when the umbilicus has the appearance of being normal. Without a detailed anatomical study of each individual case at autopsy, therefore, even antemortem blood cultures may be, if negative, insufficient to justify a positive opinion as to the presence or absence of pyogenic infection. Until the cause of syphilis is positively determined it will be impossible to deny that the syphilitic poison alone may be the cause of hemorrhages into the skin and viscera without the addition of a secondary sepsis. Bacteriological study of cases of hemorrhagic disease in which syphilis was undoubtedly present tends to give results similar to those obtained in cases without syphilitic taint. That a syphilitic infant may present more points of entrance for a secondary or even a terminal infection is plain. The question must for the present remain an open one. Whatever may prove to be the specific or non-specific etiological factor in these hemorrhagic conditions, it would seem that one of its modes of action is a destructive one on the walls of the bloodvessels.

An interesting suggestion comes from the work of Flexner and Noguchi who have found in rattle-snake venom a substance they designate as hemorrhagin, and which proves to be a cytolysin for endothelial cells of bloodvessels. Histological studies have borne out this fact. That other poisons and the pyogenic bacteria as well may be proved to produce a similar toxic body is probable. It is along these lines of pathology that enlightenment on the subject of hemorrhagic disease of the newborn is to be looked for, heredity and the conditions influencing the child during and immediately after birth being given due consideration.

A case of *icterus neonatorum* with purpura is reported by Talley,[1] in which a very stubborn and dangerous hemorrhage followed a simple puncture made to obtain a sample of blood for examination. Among the remedies used locally in this case were cold adrenalin (1:5000, and, finally, 1:1000); tannic acid, alum, gelatin, and, finally, Monsell's solution, which was the only thing that had any effect. Even this was effective only for a time, as oozing would begin again at some part of the vesicle. The lancet wound stopped bleeding at about the end of the fourth day. Internally the child took first suprarenal extract, half a grain every two hours; and, later, adrenalin solution, 1:1000, one drop every two hours, without any immediate effect upon the hemorrhage. To this was added half an ounce of gelatin solution (one drachm to one pint) every three hours, but still without the desired result. Later, calcium chloride, half a grain every two hours, was given, and in less than forty-eight hours the oozing stopped, after having persisted for a week. The cause of jaundice in this case is obscure. The purpura was toxic, and, no doubt, dependent upon the jaundice. The difficulty of checking the oozing would make one chary of attempting blood examinations in purpuric conditions, especially in children. Monsell's solution locally, and calcium chloride internally appeared to have the best effect upon the bleeding, although the calcium chloride had the advantage of having followed the administration of adrenalin and gelatin. The suprarenal extract appeared to check best the appearance of new petechiæ.

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[1] Archives of Pediatrics, September, 1904.

Another excellent paper upon these hemorrhagic diseases in young children is that of Stowell.[1] Like many other conditions purpura is not a disease by itself, but a manifestation of other diseases. It is apparently due to several causes. Among them Stowell enumerates the following: vasoneurosis, as in locomotor ataxia; a drug, as iodide of potash; an infectious disease, as diphtheria or smallpox; a diathesis, as rheumatism; a special germ; and a toxin, as in enteritis following the ingestion of tainted food. He cites a series of cases from which he deduces the following conclusions as to the indications for treatment: Of maximum importance, probably, is the proper management of feeding of these patients, orange or lemon juice being frequently called for. Calcium chloride increases the coagulability of the blood and tends to check the hemorrhages. Vegetable acids and arsenic are useful. Among the drugs stypticin and suprarenal gland stand first, a number of cures of intractable cases having been reported through their use. Adrenalin probably is our best drug.

Septic Infections of the Newborn Infants. It becomes yearly more apparent that many of the serious diseases marked by hemorrhages, jaundice, or fever are due to septic infection. Many of these take their starting point from the navel, but any mucous membrane or abrasion of the skin may be the portal of entrance for septic bacteria. Bardillion[2] calls attention to the frequency of the otic origin of these infections in children. This is particularly frequent in hospitals. The infection may travel from the nasopharynx into the middle ear and spread from there to other localities. In the infants who die suppuration of the ear is commonly found. A very large number of the diseases believed to originate in the digestive system are septic infections from this locality. The digestive disturbance is secondary to the septic fever and is the result of the septic poison. The diagnosis of ear infection is difficult because perforation of the tympanum is rare and the local symptoms are not pronounced.

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[1] Medical News, March 26, 1904.

[2] Revue mens. des malad. de l'enf., November 9, 1904.

Ophthalmia Neonatorum. The prevention of this grave condition is the subject of an excellent editorial article[1] inspired by an extended paper by Dr. Sydney Stephenson, of Dublin. This article is a vigorous endorsement of Credé's method of prophylactic treatment. Stephenson quotes statistics which prove beyond doubt that if physicians carry out Credé's method they will do much toward diminishing the number of cases of blindness which develop every year. It will be remembered that Credé's method of treatment consists of placing a single drop of a 2 per cent. solution of nitrate of silver in each eye of the baby as soon as it is born. In 1881 Credé wrote that during the seven years before the adoption of his plan 10 per cent. of the 2266 babies born in the Leipzig Maternity Hospital developed ophthalmia, whereas after the systematic use of the silver solution only one child among 1160 was attacked. Howe, of Buffalo, has been foremost in this country in advocating this valuable prophylactic measure, and has published many papers in which he has earnestly urged the great good which follows the use of this measure whenever there is reason to suspect that the genital tract of the mother is infected. Statistics establish beyond question that the silver solutions are the solutions of choice for this purpose. Thus, Howe points out that the percentage of ophthalmia in 1223 births in which a 1 per cent. solution of silver nitrate was employed was 2.42, whereas when carbolic acid was employed it was 7.7. It is true that when a 1 per cent. corrosive sublimate solution is used the percentage drops to 0.47, but there is evidence to show that the mercuric chloride does not exercise so innocuous an influence upon the eye as does the nitrate of silver. Stephenson is convinced that the nitrate of silver is, after all, the remedy par excellence; nor does he believe that it commonly produces cloudiness of the cornea or other disagreeable after-effects, although he admits that an appreciable reaction with some reddening occurs in many infants who are treated in this manner. He can find no evidence to show that an application of this solution does cause actual inflammation of the conjunctiva. It is a noteworthy fact that Abbe, de Schweinitz, Pomeroy, and Hansell, four American ophthalmic surgeons, have reported instances of bleeding from the conjunctiva after the use of silver drops, but Stephenson does not believe that the drops were actually the cause of this complication. Against the inconclusive statements regarding injury to the cornea by the use of nitrate of silver may be placed the fact that among 30,000 babies treated by Credé's method by Leopold[1] an unfavorable reaction was never observed. The same remark applies to the 24,723 babies tabulated by Koestlin. It may be taken for certain, as Lucien Howe has shrewdly pointed out, that if a bad result could be traced to the Credé method the fact would be accorded a wide publicity. The sole disadvantage of the Credé method, according to Stephenson's view, is the production of a more or less trivial catarrh of the conjunctiva.

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[1] Therapeutic Gazette, December, 1903.

Umbilical Cord Hernia. This is not a common condition, as shown by the fact stated by Lindfors that it was seen only once in 5184 births occurring at the Munich Maternity Hospital between the years 1862 and 1881. Block records one in 5000 births at the Berlin Charité, and Vienne did not meet with any instance among 3043 births observed at the Paris Charité. Rogier states that it occurs in 2.7 per cent. of all newly born infants. A case is reported by Wollstein.[2] She divides cases of hernia funiculi umbilicalis broadly into two classes: those in which the intestines only are contained in the hernial sac, and those in which other viscera, especially the liver, lie outside the abdominal cavity proper. Many of the latter must be classified as cases of eventration or ectopia viscerum, when the umbilical opening is so wide that the larger part of the abdomen, with or without part of the chest, remains open and the amniotic sac contains most of the abdominal viscera. Such cases are frequently accompanied by lordosis or scoliosis. The difference between the two varieties is one of degree, as regards the extent of ventral body wall remaining undeveloped. Hernia into the umbilical cord is frequently accompanied by other malformations. Anencephalus, spinal curvatures, spina bifida, club-foot, persistent cloaca, multiple intestinal atresia, and extrophy of the bladder have all been recorded. The hernia is sometimes so large that it proves an obstruction to delivery. Its coverings consist of three layers—amnion, Wharton's jelly, and peritoneum. The contents vary. A few loops of small intestine alone may be present or the cæcum as well as most of the large intestine may be in the sac. The stomach, pancreas, spleen, liver, and kidneys have all been found outside the abdominal cavity. Cases in which the heart and part of one lung are prolapsed must be classified as true eventration. The umbilical cord is inserted at the apex of the mass. When the liver is contained in the sac the cord is usually found attached at the side toward the left, rarely on the right. Since the work of Linfors, in 1882, the radical operation for the cure of this condition has become general, and is indicated in every instance where prematurity or extensive malformations do not interfere with the child's viability. Cures have resulted from operations performed in the first hour after birth.

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[1] Berliner klin.Wochenschrift, No. 33, 1892.

[2] Archives of Pediatrics, June, 1904.

Fungosity of the Umbilicus. The treatment of this troublesome condition is discussed by Vargas.[1] It is difficult to treat on account of its persistency. It gives rise to much discomfort on account of the constant discharge and the impossibility of keeping the parts clean. Palliative measures are often completely useless, and the application of chemical caustics or the galvanocautery are the only methods which can be hoped to effect a cure. Vargas reports a case of umbilical fungosity in a child aged three and one-half years. The cord fell off on the fourteenth day after birth, and left a projecting and ulcerating stump which grew and discharged a fetid and sometimes a bloody fluid. This condition persisted the entire three and a half years. Before applying the galvanocautery a solution of protargol, 5 per cent., was applied to the fungosity on cotton. This was covered with some gauze and bandaged into place. After eight days the fungosity began to heal; the dressing was removed a week later, and the whole stump was found covered with a new epidermis. Twenty-five days after the second application of protargol the cure was complete.

Acute Pemphigus of the Newborn. Eighteen cases of acute pemphigus occurring epidemically in newborn infants are reported by McGuire.[2] The epidemic was traced to infection which was carried by a midwife who had the care of the children. The lesions appeared on the third or fourth day, and there were general symptoms of acute toxæmia. Eight children died, giving a mortality of 44.4. The observations made upon these cases demonstrated that the disease was due to infection with a pathogenic organism, the staphylococcus pyogenes aureus, conveyed from case to case by the midwife. Though appearing chiefly in the newborn and only fatal to these, it attacked also older children and adults. It was characterized by a bullous eruption on the skin variable in distribution and extent, the specific micro-organism being found in the contents of the vesicles. In many of the cases no symptoms other than the skin eruption were manifested, but a certain group of cases showed grave symptoms of a general infection, and invariably ended fatally. The point at which the systemic invasion arose in these cases was the unhealed umbilical scar. The treatment to all appearances had little or no effect upon the course and duration of the disease, whatever the result.

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[1] La méd. de los Ninos, vol. iv., No 45; Archives of Pediatrics, September, 1904.

[2] British Journal of Dermatology, December, 1903.

Sternomastoid Hæmatoma. Three cases of this not uncommon condition are reported by Kilmer.[1] It is invariably caused by injury during the birth of the child. In breech presentations in which force is used in trying to disengage the after-coming head by pulling upon the child's legs, this affection is almost certain to follow, on account of the laceration of the mastoid muscle. It is, therefore, more frequently seen in breech than in vertex cases, although any undue traction exerted on the presenting head may also cause a hæmatoma. Partial asphyxia of the infant greatly increases the danger of this injury on account of the atonicity of the muscle and the weakening of the bloodvessel wall. The hemorrhage takes place into the tissues of the sternocleidomastoid muscle. The size of the tumor varies from that of a small hazelnut to that of a walnut; sometimes the whole length of the muscle is involved. The position in which the infant holds his head is characteristic. The head is drawn toward the affected side by the contraction of the muscle. The usual duration of the swelling is from one to three months. A torticollis may persist after the swelling has disappeared. The differential diagnosis between hæmatomata and swollen lymph nodes is easily made by the fact that the hæmatomata are situated in the substance of the muscle while the swollen glands are not. The mass is present from the beginning, but it is not usually noticed until the baby is from two to eight weeks old, when it has become hard and firm. When the injury occurs the blood escapes from the torn vessel and causes a soft swelling between the torn muscle fibres; the swelling is somewhat tender. The tumor gradually becomes harder as the clot is converted into fibrous tissue.

If left to themselves these tumors probably always disappear. Little can be done to hasten their disappearance, though gentle massage may accomplish something. In one of the cases reported by Kilmer operation was insisted on by the parents. The pathologist's examination showed that the growth consisted solely of bundles of striped muscular tissue, fibrous connective tissue, and leukocytes sufficiently numerous to indicate inflammation.

Although in cases of hæmatoma the head is usually drawn to one side, the condition should be differentiated from simple torticollis. From a study of forty cases of congenital torticollis Maass[2] concludes that torticollis of intrauterine origin is rare. He believes that it usually occurs during birth, not as the result of tearing of the muscle, as Stromeyer contends, but in a traumatic necrosis of the muscle which has healed by formation of cicatricial tissue. This lesion, which is found principally in breech or forceps cases (80 per cent.), is due less to direct pressure on the muscle than to its hyperextension. When the distortion is too great to hope for regression by binder, massage, and moist heat, Maass has recourse to Mikulicz's operation (partial resection of the muscle). With older children a postoperative orthopædic treatment should be continued for a long time, in order to correct secondary deformities of the vertebral column.

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[1] Medical Record, February 7, 1904.

[2] American Journal of the Medical Sciences, January, 1904.

Premature Infants. The caloric needs of premature infants have been the subject of extensive investigations by J. L. Morse.[1] Six premature infants were fed on modified cows' milk prepared by the Walker-Gordon laboratory. The caloric value of the food was determined, and the babies were very closely observed. Morse concludes that gain in weight depends as much and perhaps more upon the digestion and metabolism than upon the amount of food taken or the age of the baby. From these observations the conclusions seem justified that the caloric need of premature infants is relatively greater than that of full-term infants. This greater need is due in part to the smaller size and comparatively large surface area of premature infants, which cause them to loose heat faster than do larger, full-term babies, and partly to the incomplete development of their digestive powers, on account of which they utilize a relatively smaller proportion of the caloric value of the food ingested. This conclusion emphasizes the necessity of protecting premature infants from loss of heat and of providing for them a food which will throw the least work upon the partially developed digestive powers.

Rachitis. Although rickets has been recognized and studied for more than two hundred and fifty years, there is still much uncertainty as to its etiology. It is widespread and has been studied by careful observers in many countries. It is essentially a disease of temperate and cold climates. It is especially prevalent among the people of warm climates who migrate to northern latitudes. Freeman[2] reports a series of observations made upon three groups of infants in New York with the object of determining the cause of the disease. He refers to the peculiar fact that' although the condition may be produced in lower animals, we find few consistent or conclusive expressions of opinion. It is a well-known fact that the bones of rachitic children show a deficiency of lime salts. The theory was long held, therefore, that the disease was due to deficiency of lime salts in the food. Practical experiments show, however, that if lime salts be withheld the bones are softened, but a rachitic condition is not produced. More lime salts are found in cows' milk than in breast milk, and the disease is common in localities where there is much lime in the water. The theory upheld by Henoch and Baginsky that the trouble lies in failure to absorb lime salts lacks confirmation, because observations of their elimination in the urine of rachitic and normal subjects show no difference. It has been further held by Pummer that, although sufficient lime may be fed and absorbed, it may not be deposited in the neoplastic substance on account of diminished alkalinity of the blood, but it has been shown by Stoeltzner that the alkalinity of the blood is not diminished in rickets.

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[1] American Journal of the Medical Sciences, March, 1904.

[2] Archives of Pediatrics, April, 1904.

The lesions of rickets have also been attributed to the presence of lactic acid in the system or, as is held by Monti, an excess of lactic acid in the stomach with a lessened amount of hydrochloric acid. This lactic acid theory may appeal to us because of the fact that many of the foods which seem to produce a severe type of rickets contain starch which may produce lactic acid in the stomach, and, also, on account of the large content of lactic acid bacteria in some market milk. Extensive experiments on animals, consisting in the injection of lactic acid, have failed almost always to produce rickets. Spellman injected a rabbit a month and a half with 10 c.c. of a 1:200 solution of lactic acid without producing any bone lesions.

On the other hand, rickets occurs in animals on a diet which does not lead to the development of lactic acid. Guerin fed young animals on meat instead of mothers' milk, and they developed rickets. In the London Zoological Gardens more than twenty litters of lion cubs, which had always been fed on meat, were lost from the development of rickets. At last one litter with advanced rickets was seen by Bland Sutton, who advised for them milk, powdered bone, and cod-liver oil with meat. They were left in the same environment, but in three months they showed no signs of rickets. These animals were therefore dying from rickets on a diet of proteid, only of a sort rather difficult of digestion, and were cured by a diet of more digestible proteid with fat.

This leads to the inquiry whether the absence of fat in the food may not be an important factor in the production of rickets. Clinical experience has convinced many that much of the severe rickets is produced by feeding with proprietary foods and condensed milk, both of which are very poor in fat. Thus, while mothers' milk usually contains as much as 3 to 4 per cent. of fat and two to three times as much fat as proteid, we find in the ordinary condensed milk less fat than proteid, and in the pulverized proprietary foods from one-fourth to one-fourteenth as much fat as proteid. Experiments were undertaken by Herter, of New York, to produce rickets in pigs by fat starvation. One pig was fed fifty-one weeks on a limited quantity of Walker-Gordon skimmed milk, containing $\frac{1}{40}$ per cent. fat, while sows' milk usually contains 8 to 10 per cent. fat. The pig, therefore, received only $\frac{1}{300}$ to $\frac{1}{400}$ the normal amount of fat. During the fifty-one weeks the pig gained sixteen pounds. It, however, became constipated and weak; its skin became dry, and it was drowsy. It was moribund when killed. Another pig was fed twenty weeks on an unlimited supply of the same food. It also developed muscular weakness and drowsiness. A third pig was fed fifty-six weeks with skim milk and carbohydrates. This pig developed the muscular weakness and had occasional diarrhœa. Other pigs were also used. As a result of the experiments and autopsies on the pigs, Herter concluded that fat starvation in pigs does not cause rickets. No rickety lesions in the bones of these pigs were evident.

The most peculiar discovery at the autopsies of these animals was the presence of mucoid degeneration, which replaced the fat of the adipose tissue. This mucoid degeneration did not, however, occur in the animals that received an excess of carbohydrates. It thus seems fortunate that these canned foods for babies contain usually an excess of carbohydrates, since by analogy this fact may have saved the babies fed on them from a mucoid degeneration of their adipose tissue, although subjecting them to fat starvation. It was asserted by Delcourt, in 1899, that the lesions of rickets could be produced in animals by the action of phosphate of potash, and that he had produced them by the use of phosphate of potash in dogs. Spellman repeats his experiments. He gave to seven rabbits for a month daily doses of 2 to 5 grains of phosphate of potash. To a young pig he gave 700 grams of phosphate of potash in twenty days. To a rabbit one month old he gave for several days subcutaneous injections of 5 to 50 c.c. of a 5 per cent. solution of phosphate of potash. All the animals were killed, and showed no macroscopic or microscopic evidence of rickets.

Although Spellman failed in obtaining positive results, he believed the lesion to be due to some irritation, and thought it most likely that such irritation had its origin in the gastrointestinal tract. In order to determine whether intestinal poisons would cause the lesions of rickets, he made repeated injections into twenty rabbits and one cat of extracts of stools of rachitic infants, and in only one of these animals, a rabbit, did he obtain evidence of rickets. Experiments in feeding animals on the colon bacilli, and others in injecting their toxins, also failed to produce rachitic lesions. The inoculation of cultures of the staphylococcus and in other experiments of their toxins gave negative results. The toxins of the bacillus pyocyaneus gave a like negative result. Morpurgo, however, states that by injecting into young rats a pathogenic diplococcus he obtained typical rickets. Efforts made by Spellman to isolate a specific etiological organism from the intestine of rachitic infants also proved unproductive.

The theory that intestinal toxæmia is the cause of rickets is opposed by Kassowitz, who calls attention to the fact that intestinal toxæmias are summer disorders, rickets a disease of winter. In like manner the bone of rachitic infants has been found to contain the same organisms as the bone of non-rachitic children. The inoculation into healthy animals of bones removed from rachitic infants have in 5 cases given negative results. Notwithstanding his 126 failures and 1 positive result, Spellman is not discouraged and is still continuing his investigations.

It may be remembered in considering all this experimental work that one positive result is of the greatest value; while negative results, though of value for reference in future experiments, should not produce much influence on our opinions, we should especially not apply to children any deductions from experiments on animals, which gave negative results. This statement is well supported by experiments of Spellman, in which he subjected various animals to the combination of the conditions we believe to produce rickets in babies: poor air, poor light, defective forms of food, etc. All died from gastroenteric disorders in from one to four months, but not one showed any sign of rickets.

If, then, we review the positive result of these experiments we must reject those of Delcourt, in which phosphate of potash was administered, since they lack confirmation, although repeated by Spellman. Morpurgo obtained positive results in rats from the injection of a pathogenic diplococcus. There is, however, no confirmation of this observation. Spellman in one experiment obtained rachitis from the injection of extracts of the diarrhœal stools of rachitic children. Bland Sutton found that young monkeys deprived of mothers' milk and fed on vegetables and fruit became rickety. Two young bears fed on rice biscuits and raw meat had extreme rickets.

Freeman reports some carefully made observations, the results of which are shown in the following table:

INDICATIONS OF RACHITIS IN THREE GROUPS OF BABIES.

	No.	Average age.	Sweating.	Bald spot on head.	Rosary.	Pot belly.	Small thorax, large abdomen.	Delay'd dentition.	Craniotabes.
TENEMENT HOUSE.									
Bottle-fed	13	4½ mos.	0 %	77 %	70 %	46 %	28 %	....	8 %
HOSPITAL.									
Breast and condensed milk	66	8 mos.	85 %	76 %	91 %	57 %	42 %	16 %	45 %
Modified milk	25	10 "	20 %	56 %	88 %	44 %	32 %	50 %	12 %

A study of these statistics shows the peculiar fact that the tenement-house children make a much better showing than those in hospitals, even when the hospital babies are for the most part breast fed, and here we have data apparently at variance with the accepted ideas. In one group of hospital babies we have ample light, good air, cleanly surroundings, and mostly breast milk, with 90 per cent. rosaries. We cannot then agree with Morse, who examined for rickets 318 dispensary babies in Boston, and concluded, after a careful study of the nationality and food, that they had only one influence in common, and that was unhygienic surroundings. Freeman concludes his study with the statement that experiments on animals would seem to indicate that unsuitable food is capable of producing rickets, and that possibly certain bacteria or intestinal toxins may produce a similar result. The clinical observations are too limited for any positive deductions, but are interesting inasmuch as they indicate less rachitis in the tenement house than in institution children fed on modified milk, and the greatest amount of rachitis in institution babies fed on breast milk with auxiliary feedings of condensed milk. In discussing Freeman's work Shaw, of Albany, referred to the work of Monti, who found that in nearly every case there was a previous history of some stomach disorder. Examination of the stomach contents showed an increased amount of lactic acid and a diminished amount of hydrochloric acid. His theory was not that the lactic acid produced rachitic changes, but that they were influenced by the diminution of the hydrochloric acid. Zweifel lays much stress on the diminished amount of hydrochloric acid in the stomachs of these cases. He showed that the amount of hydrochloric acid is dependent on the amount of sodium chloride ingested, and that the nursing mothers in Saxony receive very little salt in their food; hence, their nursing babies frequently show signs of rickets. He comes to practically the same conclusion as Monti, through a different course of reasoning.

The heredity of rickets is believed in strongly by F. Siegert.[1] He holds that hereditary tendency is one of the most important factors in the causation of rickets, the disease being transmitted commonly through the mother. Other important causes he believes to be disease of the digestive and respiratory organs.

Nathan,[2] of New York, also considers the etiology of rickets and reviews the various theories that have been advanced, basing his paper on the records of 803 cases. Many of them, however, were seen but once or twice. He tabulated 477 cases with reference to treatment. A remarkable uniformity of results is shown in the three classes of cases treated by monocalcic phosphates, cod-liver oil, and phosphorus. These tables would seem to show, in fact, that the medicinal treatment had little or no influence on the course of the disease. From these studies Nathan believes that we must conclude that a deficiency in the quantity or a faulty absorption of the calcium ingested is not the cause of rachitis. Such being the case, and our only clue to the etiology of the disease being the faulty deposition of lime salts in the bones, the assumption that an abnormality of metabolism, which, besides causing other abnormalities, is inimical to the normal calcification of the bones, must form the starting point of our search for the cause of rachitis. How such an anomaly is induced is difficult of explanation. Moreover, it will remain difficult or impossible to explain until we have a better understanding of the nature of the anomaly than we have at present. In this respect we are, as Vierordt aptly remarks, still completely in the dark.

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[1] Jahrbuch für Kinderheilkunde, December, 1903.

[2] Medical News, February 27, 1904.

After all the study that has been given to this subject we must unfortunately conclude that this final statement most clearly expresses the conditions. The evidence of various series of statistics is so conflicting that we are forced to conclude that we have not yet discovered the ultimate cause of rickets, and are still in the dark regarding its true nature.

Clinical observations of rickets have been so carefully and extensively made that it would seem that there is but little more to discover. However, Jacob Sobel[1] asserts that radiographs show enlargement of the phalanges in rickets. The thickening occurs at the middle of the shaft and not at the ends of the bones, so that each bone is spindle-shaped. While Sobel is not the first to call attention to the rachitic changes of the bones of the hands and feet, his description, so far as I know, is the most complete that has appeared.

A case of marked diastasis of the recti muscles in rickets is reported by Francine.[2] This condition is another which has received little if any attention from medical authors. The responsibility for diastasis of the recti muscles in rickets rests, primarily, upon developmental lack of tonicity on the part of the muscular system. It shows itself in weakness of the abdominal walls and in dilatation of the stomach and gut; and is, secondarily, induced by the associated tympanites of gastro-intestinal fermentation. The pot-belly and the diastasis are thus the result of gaseous distention of the stomach and colon, acting upon relaxed and weakened abdominal walls.

The origin of craniotabes has been carefully studied by Rasumoffsky.[3]

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[1] Medical News, February 13, 1904.

[2] Archives of Pediatrics, February, 1904.

[3] Ruskii Vratsch, vol. iii., No. 5; Archives of Pediatrics, May, 1904.

His work is based on the microscopic study of twenty-one infantile bodies. He concludes that there are two kinds of cranial softening in children, the rachitic and the non-rachitic, the latter being due to atrophy or undeveloped structure of the bones, while the former is produced by lack of lime salts in conjunction with the pressure of the brain on the tender bone. The rachitic changes are seen most frequently after three months, while the atrophic changes may begin even during intrauterine life. Rachitic softening of the skull can be recognized on the living child only in the presence of the characteristic rosary on the thorax. Atrophic craniotabes may be due to syphilis, and in such cases must be looked upon as congenital. The microscopic pictures of the rachitic and the non-rachitic craniotabes are widely different.

Chondrodystrophia Fœtalis. The pathology of this condition was considered in these pages two years ago.[1] A very excellent article upon the subject is contributed by Nathan.[2] His description of the clinical characteristics is particularly interesting. The lower extremities are always too short, being entirely out of proportion to the length of the trunk. This causes a decentralization of the body, and tends to give these cases a very characteristic and at times a very ludicrous appearance. It readily distinguishes them from other dwarfs; for in cretinism, or in the so-called idiopathic dwarfism, the extremities and the trunk are both shortened and not out of proportion. The upper extremities are also too short; they do not, as in the normal individual, reach to the hips. The fingers and toes are too short, and, in fact, the conditions found in the living subject are exactly what the pathological anatomy would lead us to expect. During early life these individuals are obese, and the natural skin folds are exaggerated, but as they grow older the obesity gradually disappears. The mental faculties are always intact; these children are not sluggish and somnolent, but bright, taking an intense interest in their surroundings and learning to talk as readily as other children. If the older individuals are backward in their studies, it is more because they are apt to be kept from school because of their small size and peculiar appearance than from lack of intelligence. They begin to walk late, as a rule, and those cases with complicating osteoporosis do not do so for a long time; but when they have learned to walk their gait is no way peculiar or unsteady.

Infantile Scurvy. Although numerous cases of infantile scurvy have been reported, but little that is really new has been added to our knowledge. J. L. Morse[3] calls particular attention to the fact that *hæma-*

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[1] PROGRESSIVE MEDICINE, March, 1903, p. 267.

[2] American Journal of the Medical Sciences, April, 1904.

[3] New York Medical Journal, August 14, 1904.

turia is not an uncommon symptom. In some cases it is, in fact, the earliest and even the only symptom for a time. Scurvy, he believes, is the most common cause of uncomplicated hæmaturia in children. Neter[1] also asserts that hæmaturia may for a time be the only symptom of scurvy in infants. The child may be fretful, but definite symptoms may not otherwise be present. Still[2] also speaks of hæmaturia as a symptom. It is a part of the general tendency to hemorrhage shown in the disease. Slight albuminuria even without blood may also occur. He asserts, however, that true nephritis is not uncommon.

The treatment of scurvy is particularly considered by Cheney.[3] It is a disease in which proper treatment works a miracle. It has no tendency to spontaneous recovery; but when recognized and given proper care improvement is immediate and recovery surprisingly rapid. No other disease affords a physician a better prospect for brilliant results; although the treatment advised by Cheney is not new, but is what has been advised by all authorities of experience, it cannot be too often repeated. Three measures are indicated, and are sufficient for the cure of any case: (1) Discontinue the proprietary food. Substitute for it a mixture of fresh milk diluted with water or with oatmeal water. (2) Give fresh orange-juice in dose of one to three teaspoonfuls three times a day. It is surprising how babies with scurvy take to this and seem to enjoy it. (3) Give freshly expressed beef-juice, squeezed from rare steak, in dose of from one to two teaspoonfuls three times a day. Give no medicine at all.

Marasmus. This condition, frequently known as athrepsia, infantile atrophy, or simple wasting, is a very important one to the pediatric practitioner. It is a vice of nutrition and is defined by Holt as an extreme form of malnutrition seen in infancy, occurring, so far as is known, without constitutional or local organic disease. In its more marked forms it is not often seen in private practice, and is rare in the country. Cases of malnutrition, however, of a less serious type are very common in private practice, both in the city and in the country. It is of frequent occurrence in dispensary practice, and may be seen in every institution for infants. It is an immediate result of hospitalism. It is the determining factor in the fatal result in a large number of cases. Some other disease, however, such as diarrhœa or pneumonia, is usually the immediate cause of death, and is, therefore, usually so accredited. It is due in the vast majority of cases to two causes: improper food and unfavorable surroundings. The two conditions are usually combined. The feeding may be very faulty, but if the child is in healthy surroundings in the country where it receives plenty of pure air it is rarely the victim of marasmus. On the other hand, breast-fed infants even in the most unfavorable surroundings rarely show serious signs of malnutrition. But combine bad food with bad surroundings and wasting is very prone to follow. If added to these factors there is inherited constitutional weakness we have the conditions best suited to produce atrophy. "The odds are so against an infant that its feeble spark of vitality flickers for a few months and gradually goes out."

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[1] Deutsche medizin. Wochenschrift, May 5, 1904.

[2] Lancet, August 13, 1904.

[3] Medical News, June 4, 1904.

Holt has drawn special attention to the frequency of marasmus in overcrowded institutions. It is the experience of every hospital physician that artificial feeding, even if the methods are approved and perfect, is especially difficult in hospitals and institutions. The children in such institutions gradually waste and lose weight and succumb to the mildest of acute maladies. It cannot be too strongly stated that children should be kept in hospitals as short a time as possible. As soon as their acute illness is passed they should be removed from the hospital. They will frequently convalesce more satisfactorily in tenement houses than they will in the hospital wards. The error is made in most hospitals of placing too many children in one ward. It is a common impression that because children are small they do not require the air space that adults require. The contrary is the fact. Children require more air space than do adults. One thousand cubic feet for each patient should be the minimum, and more than this is desirable.

An interesting study of the relation of the *thymus gland* to marasmus was recently made by J. Ruhräh.[1] He states that the most characteristic lesion of marasmus, except the wasting of fat and muscles, is not mentioned in any of the text-books on the diseases of children. This is a wasting of the thymus gland. There are two conditions in which there is atrophy in infants: the primary cases in which the cause is as yet unknown, and those that follow definite pathological conditions, or the secondary cases. The dividing line cannot at this time be definitely drawn. For the present he thinks the cases should be divided on a pathological basis into those where there are lesions of definite diseases, and those where there are no special and constant lesions, except the wasting of the muscles and the body fat, and, as he now points out, of the thymus gland as well. It is known that the thymus gland bears some relation to the state of nutrition of the body, but its exact relation to the assimilation is not yet understood. In the eighteen cases observed by Ruhräh atrophy of the thymus was the only distinctive lesion found at the autopsy. He asserts that microscopic observations of the thymus will clearly indicate the state of the child's nutrition. In normal infants the structure of the thymus is unaltered; in moderate atrophy the cortex and medulla are not easily distinguished, while in severe atrophies the other changes mentioned above are clearly seen.

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[1] British Medical Journal, August 29, 1903.

It is well known that malnutrition is closely associated with tuberculosis and results from it; while, on the other hand, malnutrition predisposes to tuberculosis. Fischer[1] reports a study of 5000 cases in children of the poorer classes, made chiefly to determine the relation of malnutrition to tuberculosis. He found that some degree of malnutrition almost invariably preceded tuberculous infection. The influence of the administration of chloride of sodium upon the weight of nursing infants has been investigated by Nobecourt and Vitry.[2] They conclude that the addition of salt to the diet of infants who are under weight is of considerable value. It is also valuable for premature infants and those of a marasmic tendency. They advise the use of 1 cgm. for each 100 gm. of body weight.

Infant Feeding. BREAST FEEDING. Some interesting observations made on 1000 children are reported by Hubert Armstrong.[3] These children were all inmates of the Liverpool Infirmary for Children, and were divided into three classes. Deaths during the first day of life were not included, and the statistics were based upon the rate per 1000: (1) Wholly breast-fed up to six months or over, 689 cases—deaths, 84.14. (2) Breast-fed to the same age with the addition of cows' milk or various foods, 127 cases—deaths, 133.86. (3) Entirely hand-reared, 184 cases—deaths, 228.26. These statistics were those of the first year of life, and teach a lesson which requires little comment.

During the last three years Chapin has written largely upon the function of the milk of each animal in developing the stomach for the food it is to take in later life. He has contributed another excellent article[4] touching upon this subject. It considers particularly the influence of breast-feeding on the infant's development. When the doctors, the nurses, and the mothers come to realize that nature does not intend a child to take anything except breast-milk as food until its digestive tract is completely formed, and that maternal milk helps in the formation of a strong and vigorous stomach, there will be less trouble with artificial feeding. Careful feeding will commence at once, and the start will be made with a fairly well child and not with one that is suffering from a perversion of the digestive apparatus. The mothers will be taught that a food that "agrees" is not necessarily the proper one for continued use, and that the change to something else may have a useful purpose, and that in the art of feeding there are other problems than mere gain in weight to be considered.

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[1] American Medicine, June 11, 1904.

[2] Revue mens. des malad. de l'enf., March, 1904.

[3] British Journal of Children's Diseases, March, 1904.

[4] Archives of Pediatrics, August, 1904.

Poor nutrition paves the way for sickness. The breast-fed infant is not as susceptible to disease as the artificially fed baby, and when attacked recovers more promptly, as it has more vitality and reserve force. Condensed-milk babies proverbially succumb to any serious illness, and when the small amount of proteid in highly diluted condensed milk is considered it is surprising that any other result could be expected, as the infant has in this food little from which a strong, vigorous body can be constructed. Too much attention has been paid in the past to gain in weight, and too little to the character of the flesh. Of two animals of the same weight one may be a little dwarf, enclosed in a mass of dropsical fatty tissue, while the other may be a giant in comparison, when the amount of blood and size and strength of the vital organs are determined in both. This difference is due to feeding too little proteid to the dwarfed animal. From a nutritive standpoint alone, the breast-fed infant has a great advantage over the bottle baby, but it has other things greatly in its favor also. Mothers' milk is more than food as we think of food for adults; it is a food that adapts itself to the infant's developing digestive tract.

The form which the mother's milk assumes after it reaches the stomach depends upon the state of the development of the stomach. In the early stage of lactation the secretion of the stomach is the rennet ferment which changes the casein of the milk to a soft solid mass or curd which is not digestible by pepsin. The character of this mass or curd differs with the kind of milk. When the stomach secretes hydrochloric acid it combines with the curd and forms chloride of paracasein, a compound much denser than rennet curd or paracasein. This compound of curd and acid is readily digested by pepsin, and gastric digestion commences. As fast as the secretion of pepsin and acid increases in quantity and strength the mother's milk is ready to use it up, and we find as the child grows older and its stomach increases in size and becomes stronger that it takes longer for it to empty, and that the feeding intervals must be made greater. An artificially fed baby is a premature child from a physiological standpoint, and anything but maternal milk is foreign to its digestive tract. Chemical analyses of foods will not show all their defects or advantages; these are often brought to light only by a study of physiology and pathology. The reason for so much difficulty in feeding cows' milk to infants is that digestion in the calf is different from infantile digestion. Cows' milk is physiologically adapted to a calf's digestion; human milk to the infant's stomach.

Artificial food for an infant should contain as much nutriment as breast-milk; it should be as digestible, and it should adapt itself to the developing digestive tract. Milk of some kind must be the foundation of food that is to be the regular diet, as its casein is the only form of proteid that will change its character with the change of digestive secretions. As the stomachs of mammals differ, so their milks differ, and there can be no scientific infant feeding unless this fact is kept in mind.

Many children are taken from the breast without adequate cause. The mere fact that a child is not thriving at the breast is not sufficient reason for weaning it. Many a child is weaned without any investigation as to the frequency or regularity of nursing or the health and habits of the life of the mother. Northridge[1] discusses many of these questions, and from his own experience is convinced that attention and earnest effort would result in many mothers nursing their babies who had believed themselves unable to do so. That a mother is nervous, or subject to fits of anger, or is unhappy, or does not wish to nurse her baby, is not adequate reason for weaning. If a mother insists on weaning her child against the advice of the physician she should be made to fully understand that the responsibility is her own. Many physical conditions, like fissure of the nipple or painful breasts, should not be considered as valid reasons for weaning. Greater care on the part of physicians in explanation to the mother would result in the breast nursing of many babies who are artificially fed.

ARTIFICIAL FEEDING. A noticeable feature of much that has been written during the last three or four years is the growing appreciation that all infants cannot be fed according to one scale or table or by one method. Study of the individual child is insisted upon as a requisite of successful feeding. This is the ground taken by Rotch[2] in one of the best articles which appeared during the past year. He insists that infants cannot be fed by rule of thumb. We can only lay down the general principles governing the milk supply and subsequent modification of the milk and finally, its adaptation to the individual infant.

Each infant must be studied by itself. The most successful feeder of infants will be the man who is best acquainted with the many resources in our modern methods of percentage feeding, and who can appreciate the individual needs of the especial infant.

One of the most notable recent investigations made upon infant feeding is that of Park and Holt,[3] a preliminary report of which I referred to last year This report is based upon investigations carried on for more than two years by physicians connected with the Rockefeller Institute for Medical Research, the New York Department of Health, the Carnegie Laboratory, and the Good Samaritan Dispensary, into the feeding of cows' milk to healthy infants in tenement houses. For comparison, however, a number of institutions are included. These observations, excluding imperfect cases, were made upon 632 babies. This report is well summarized in an editorial article in a subsequent number of the same journal.[1] It makes special note of the fact that no special varieties of bacteria were found in untreated milk which seemed to have any special causative importance. The varieties of bacteria found in raw milk were many, but they did not seem pathogenic. Cases of indigestion were observed where Pasteurized milk more than thirty-six hours old was used, and the bacteria were found to be numerous, mostly of the spore-bearing varieties. The observers were confronted with two facts that limited the field of investigation. The first was the unexpected difficulty in finding fewer bottle-fed babies than the physicians connected with the hospitals and dispensaries had expected to see, and the second, that the proprietary foods were not in general use in tenement houses. The clinical investigations were carried on with the following forms of milk: condensed milk, store milk, bottled milk, milk from Pasteurizing establishments, and boiled milk from a dispensary

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[1] Brooklyn Medical Journal, January, 1904.

[2] Archives of Pediatrics, August, 1904.

[3] Ibid., December, 1903

The bad results from the use of condensed milk were most apparent. Two cases out of 48 died during the winter; 14 out of 70 cases died during the summer. This was a worse showing than that made by the "store milk." In this series were 55 children without any mortality in the winter, and 79 children in the summer with a mortality of 15. More cases did badly on "store milk" in the summer than on condensed milk, although this difference was not striking. It was noted that babies fed on condensed milk succumbed rapidly to the disease. Pasteurized and bottled milk from the milk depots and dispensaries gave good results. Fifty cases received this milk in winter without a death. In summer 145 cases, showed a mortality of 4. A limited supervision was exercised in these cases, as the mothers reported at the dispensaries, and were furnished milk in separate bottles suitable for each feeding. When bottled milk was used the results were not satisfactory. The milk was classed as "good bottled milk" and "best bottled milk." Sixty-eight babies were fed on the former in the winter and 3 died; 6 babies were given the best milk in the winter and 12 in the summer without a death. These latter figures were, however, too few for accurate comparison. Comparison was made between a group of babies fed on Pasteurized milk and a group fed on a fair grade of raw milk, both kinds being distributed from a central station. It was observed that the raw milk seemed to cause more illness, and the duration of diarrhœa was three times as long as when the Pasteurized milk was given. The bacteria in the raw milk averaged in the morning count 1,200,000 per c.c., and in the Pasteurized 1000 per c.c. The cheap milk Pasteurized showed a high bacterial count, and gave the worst results. Its use was followed by diarrhœal diseases and a great many deaths. The so-called "good milk" was not of the high grade of the "best milk." This good bottled milk was not as successful as it was expected it would be. An interesting fact is shown in the figures for the breast-fed babies, who numbered 31 in the summer series, without a death. In the table of summer cases were 217 infants under six months, with a mortality of 13 per cent; 191 were between six and twelve months, with a mortality of 8 per cent. A total of 50 cases of diarrhœa were observed in the three months of June, July, and August, with 9 deaths. Not one of these were entirely breast-fed. The authors in summarizing this work draw the following conclusion relative to the immediate effect of the milk: It was observed that during the cool months the morbidity and mortality were not appreciably affected by any kind of milk nor by the number of bacteria. In summer, however, the influence of poor milk, particularly condensed milk and that from stores, was decided in causing illness and death. The number of bacteria which may accumulate before milk is harmful differs with the character of the bacteria present, the age of the milk, and the temperature at which it is kept. When milk had been kept cool the injurious effect of bacteria was found to be less with every month over one year of age. With milk of average quality it was observed that during the warm weather those infants that were fed with milk that had been previously treated did better than those infants who had raw milk. Fresh, clean milk in sealed bottles and milk from central stations where there was a constant oversight gave the best results. The latter method of feeding is urged as being less expensive and under a closer surveillance than the former, and, therefore, better fitted for the average tenement-house mother. Most important of all is the plain statement that breast feeding should be encouraged by every means and not discontinued without good and sufficient reasons. The comparatively few cases of illness among the nursing babies recorded bear out this physiological truth.

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[1] Archives of Pediatrics, March, 1904.

In an article on the limitations of chemistry in infant feeding Chapin[1] shows that chemistry has limitations in actual feeding, though he does not disparage the chemical analysis of foods. He asserts that if the whole basis of infant feeding should be chemical, then the principles taught would be frequently wrong, as it is now known that some of these principles have been erroneous. Cows' milk and human milk have been analyzed many times, but the advances in infant feeding have come, not so much from these analyses, as from clinical and physiological experiments with cows' milk altered or modified in other ways than simple qualitative adjustment of the component parts. The advances made have been greater along the line of physiological adaptations of various milks to the feeding requirements than from exclusive chemical studies. If chemical composition alone is to be considered, cellulose (paper), $C_6H_{10}O_5$, should be as good a food as starch, $C_6H_{10}O_5$; cane-sugar, $C_{12}H_{22}O_{11}$, always interchangeable with milk-sugar, $C_{12}H_{22}O_{11}$; and all caseins should act exactly alike. Jordan well states the problem when he says: "A ration may be chemically right, but practically wrong; but, at the same time, it is worth much to the feeder to be sure that the nutrients which he supplies to his animals will meet their physiological needs." This principle applies to infants as well as to the lower animals.

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[1] New York Medical Journal, April 23, 1904.

Several writers during recent months have presented systems of infant feeding. At least a dozen such methods have been published within a few years. It seems unnecessary to reproduce any of these this year. Last year I gave in considerable detail[1] a method for milk modification which seems to me one of the simplest and most practical that has been devised. A simple method of considerable merit for modifying milk for tenement-house practice is given by Coolidge.[2]

A few years ago a great effort was made to secure methods of modification which would enable changes to be made of very minute fractions of 1 per cent. This has been abandoned as unnecessary. Such minute changes are rarely necessary, and in home modification, unless the strength of the milk is determined every day, considerable variation will occur by the use of the same formula. Some careful investigations were made by Edsall and Fife[3] to determine the accuracy of percentage modification. They conclude that milk modifications under the best of conditions will often vary 0.2 per cent., occasionally 0.3 per cent. from the prescribed formula, with modifications of medium strength. With low modifications the error will be correspondingly less, and with high modifications correspondingly somewhat higher. Home modifications are, within the limits just mentioned, trustworthy, if they are made by a clear-headed and careful person, from milks and creams of a chemical composition that is known to be reliable.

Unless the composition of the milk and cream is known, or if one cannot be sure that the modifier is careful, home modifications are liable to vary greatly from the formula prescribed. Laboratory modifications appear from the author's figures to be satisfactorily accurate. Unless the milk and cream as well as the person doing the modifying at home, can be fully trusted, laboratory modifications, when available, are much more reliable than home modifications.

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[1] Progressive Medicine, March, 1904, p. 232.

[2] Archives of Pediatrics, August, 1904.

[3] New York Medical Journal, January 16, 1904

The most satisfactory method of having milk modifications prepared is to have a thoroughly capable person make them at home from milk and cream of reliable composition. In this case the whole process can be kept under direct supervision. To trust the modifying to a readily confused mother, trained nurse, or nursery governess, or to most nurse maids would make the results very doubtful. The writers confess that their analyses, while not lessening their faith in mothers and nurses, do make them somewhat doubtful of their accuracy in making milk mixtures. The analyses of their modifications demonstrate how important it is, in having home modifications made, to have all the small details and, above all, the amounts of the different ingredients carefully written out or filled out on printed blanks, in order to guard as far as possible against confusion. Nothing should be left to the modifier's judgment or memory.

It is careless practice to order a certain formula for an infant, and to take it for granted that this formula is actually being taken by a child. It is, of course, difficult for those in general practice, if they have not the small facilities necessary for doing such work, to determine the fat content of the different milk mixtures that are actually being given to infants under their charge. It would, however, be very easy for many such physicians to have this done by an assistant. Those who are especially interested in pediatric practice can hardly show proper interest in their work unless they often do this or have it done. Simple centrifugal estimates of the fat are certainly quite sufficient for clinical purposes, as an indication of the accuracy of the mixtures, though an occasional proteid estimation, if one has the facilities for it, would add to the effect. At the same time it would give one constant knowledge as to their accuracy in any individual case. The apparatus required is cheaper than that used for ordinary examinations of the blood; the method requires less time, and it gives good results. It is already occasionally used by some physicians, but is not often employed by any considerable number of them.

Among the more unusual suggestions for infant feeding recently made is the use of coagulated cows' milk. In 1900 Dungurn described a method of breaking up the casein into fine coagula by means of a rennet ferment. Such milk in laboratory experiments is very easy of digestion. In practical use the milk is coagulated to the consistency of jelly when it is broken up so fine as to pass through an ordinary rubber nipple.

Plain milk can only be used, as Pasteurized or diluted milk will not coagulate. Oppler[1] reports observations upon the use of this milk. It gave satisfactory results in many cases of habitual vomiting. Oppler also approves of its use in gastrointestinal disease or when the digestion has been disturbed by a too exclusively starch diet. He disapproves of its use during the first month or two of life, and among children that have been overfed. He advises against its employment for more than a few weeks at a time.

The ability of the infantile intestine to absorb fats was investigated by Noblécourt.[2] He found that if but little fat be given it may all be absorbed, while the larger quantity may be only partially absorbed. Breast-fed infants in good condition have a marked ability to digest and absorb fats. This ability, however, is rapidly and decidedly impaired in weak anæmic infants, and in those ill from any of the acute diseases, particularly of the pulmonary and intestinal systems. The system of measurement used by the author consisted in carefully estimating the amount of fat taken with the food, and the amount excreted by the bowel.

Some observations on the starch digestion in infancy are reported by Shaw.[3] The infants were all under two months of age and the observations were made with much care. The results would seem to demonstrate that the saliva of very young infants contains a diastatic enzyme capable of converting small quantities of starch into maltose; that the diastatic action of the saliva may continue in the stomach as long as two hours after feeding; that on physiological grounds there is no reason why infants cannot digest small amounts of starch.

An extended article upon the artificial feeding of infants is contributed by Pisek.[4] It is written in a somewhat elementary manner and is a synopsis of a course of lectures delivered before a nurses' training school. For the purpose it was designed to fulfil it is an admirable article, and well adapted for the instruction of those who have but slight knowledge of the subject.

Feeding of Children After the First Year. The beginning of the second year is a very important period. While most children are watched carefully during the first year as to their growth, feeding, and management, they are apt to be neglected during the second year. The diet is often changed with too much suddenness, and the careful hygienic measures of the first year are frequently neglected. The dangers of infection suddenly and rapidly increase as the child's powers of locomotion develop.

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[1] Monat. für Kinderheilkunde, January, 1904.

[2] Revue mens. des malad. de l'enf., August, 1904.

[3] Albany Medical Annals, January, 1904.

[4] Trained Nurse, May and June, 1904.

During the first year the child is kept within narrow bounds, usually in clean beds or carriages. All this changes as the child begins to run about, and the hygienic care is often relaxed. The child, at the beginning of the second year, should be able to stand and walk beside a chair, should measure about twenty-nine inches in length, should weigh about twenty pounds, should have six incisors, and should have a stomach capacity of about twelve ounces. This is followed during childhood by an annual growth in length of about three inches each year, and a gain in weight of about five pounds each year. These amounts are a little larger for the second than for subsequent years. We thus reach a period at about the sixth year when the length in inches and the weight in pounds should be equal.

These matters are considered by Freeman[1] in an admirable paper on the feeding and care of children after the first year. He believes that most children after the first year are fed too often and on too great a variety of food. He believes, also, that they receive too little milk. The first food to be added to the milk diet should be one of the cereals. Of these, particularly oatmeal may be given in the form of a thick, strained gruel. A half-ounce of orange-juice may be given daily even before the end of the first year. A soft-boiled egg may be given by the end of the fifteenth month, and four ounces of clear soup of beef, mutton, or chicken may be given soon after. He does not use beef-juice, but begins to give a little meat by the twenty-first month.

During the second year a child should be fed five times a day; the diet at the beginning including only milk, gruel, and orange-juice, to which later may be added bread, soup, bread and butter, and at the end of the year meat. Beef-juice should only be used as a tonic. Three meals should be given during the third year, with an extra bottle of milk at 10 A.M.; the articles of food being continued with the addition of certain vegetables and simple desserts. After the third year but three meals a day should be given, including the same articles of food, and throughout childhood about one quart of milk should be taken daily. The evening meal should consist only of cereal and milk and bread and butter. Both the variety and amount of food should be carefully restricted. During the second year children should sleep twelve hours at night and have a morning and afternoon nap each day, and throughout childhood should continue to sleep twelve hours at night with one nap during the day. The dietary advised by Freeman after the first year is well shown by the accompanying tables:

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[1] Archives of Pediatrics, June, 1904.

Diet of the Second Year.

	6 A. M.	10 A. M.	1 P. M.	5 P. M.	9 P. M.
At 12 mos.	8–10 oz. milk.	8–10 oz. milk.	4 oz. gruel. 8 oz. milk. ½ oz. orange-juice.	8–10 oz. milk.	8–10 oz. milk.
At 15 mos.	8 oz. milk. 6 oz. gruel.	8 oz. milk.	Soft-boiled egg. 8 oz. milk. ½ oz orange-juice.	8 oz. milk. 6 oz. gruel.	8 oz. mik.
At 18 mos.	8 oz. milk. 6 oz. gruel.	8 oz. milk.	4 oz. clear soup. Soft-boiled egg. 8 oz. milk. ½ oz. orange-juice. Bread and butter.	8 oz. milk. 6 oz. gruel.	8 oz. mik.
At 21 mos.	8 oz. milk. 6 oz. gruel. Soft-boiled egg. Bread and butter.	8 oz. milk.	6 oz. clear soup. ½–1 oz. scraped beef. ½ oz. orange-juice. Bread and butter.	8 oz. milk. 6 oz. gruel. Bread and butter.	8 oz. mik.

Diet of the Third Year.

6 A. M.	10 A. M.	1 P. M.	5.30 P. M.
Orange-juice. 10 oz. milk. 6 oz. gruel. Soft-boiled egg. Bread and butter.	8 oz. milk.	6 oz. soup. Meat. Bread and butter. Vegetables. Dessert.	10 oz. milk. 6 oz. gruel. Bread and butter.

Diet After the Third Year.

BREAKFAST, 7–8 A. M.	DINNER, 12–1 P. M.	SUPPER, 6 P. M.
Fruit. Cereal. Milk. Bread and butter. One or two eggs.	Soup. Meat. Bread and butter. Vegetables. Dessert.	Cereal. Milk. Bread and butter.

Infant Foods. The most important artificial food for infants and the first to be considered is cows' milk. This fact has been so well established and is so universally accepted that arguments upon the subject are no longer required. For several years, in fact, pediatric writers have taken this for granted, and but little is said by them upon the subject. As this fact became more clearly established, the importance of securing clean and wholesome milk became more and more apparent. During the past decade, therefore, there has been an active campaign waged toward obtaining clean, pure, and safe milk. This campaign was originated and has been largely carried on by the medical profession. It is true that many dairymen have been found not only willing but anxious to do their part in this excellent work; but as dairymen are almost without exception ignorant of bacteriology and chemistry and lacking also as to knowledge of the evil effects of contaminated milk, it was necessary for some one possessing this knowledge to take the lead in pointing out the sources of error and in suggesting remedies. Medical men have this knowledge, and pediatric practitioners have been the first to see the evils of contaminated milk and the advantages to be derived from pure milk. With scarcely any exception, therefore, every movement looking toward an improved milk supply has been inaugurated and supervised by pediatric practitioners. The work of Coit and Rotch, undertaken along different lines and in different places, has vastly stimulated this movement, and has been largely instrumental in bringing about the system of milk commissions composed of medical men, which have done and are doing more than any other agency to improve the milk supply of cities. The good results of this work are not limited to infants, although it was in the endeavor to secure a better and safer food for them that the whole agitation started. It is entirely proper, therefore, to devote some space to this matter whenever the subject of infant feeding is under discussion. All the work and study which has been devoted to infant feeding would prove absolutely useless if the material from which the food is made is contaminated and dangerous. There is no such thing as successful infant feeding without good milk. In an admirable series of papers discussing the milk supply of cities in its various phases[1] Pearson, of Cornell University, expresses the opinion that there are four influences that are respected by milk producers—legal regulations, intelligent public opinion, the example of high-class dairies, and endorsement by responsible persons. It may be virtually said that a town may have as good a milk supply as it demands, but there must be willingness on the part of purchasers to pay a fair price for milk of good quality. It costs more to produce uncontaminated milk than it does to produce foul milk. In this same series of papers Cook describes the steps that must be taken to obtain pure milk as follows: First a healthy cow; then healthy surroundings; then a clean stable with a proper amount of air space; then a healthy attendant; then clean utensils; then, as soon as the milking is completed, the milk to be reduced to a certain temperature and held at that temperature until shipped. It should come to the middle man without being allowed to undergo any bacteriological change.

The temperature at which milk is kept is a matter of very great importance. Milk produced in clean dairies and then rapidly reduced to 40° will keep for long periods of time. Milk produced at certain American dairies was sent to Paris during the whole summer of 1900 and sold at the exposition in perfect condition. It was a difficult task to convince the Commissioners on Awards that the perfect condition of the milk was due only to cleanliness and cold. Milk used for infant feeding should never become warmer than 50°, until the bottle is warmed at the time of feeding. In May last a letter was sent by Dr. Darlington, Health Commissioner of New York City, to all milk dealers and railroads entering the city, which said that all milk the temperature of which was higher than 50° would be seized and destroyed and the offending persons prosecuted. Dr. Darlington said that more than 2,000,000 quarts of milk came into the city daily and that fully 4,000,000 persons are supplied. He believed that 25 per cent. of the deaths among babies in summer was due to milk rendered dangerous by its high temperature. As long as the temperature of milk is kept below 50° there is little if any danger, but when the temperature rises to 55° or 60° the germs split up and multiply with great rapidity. All milk above 50° will hereafter be destroyed in New York, and the violators will be subject to a fine of $25.00 or $500.00. The milk inspectors have been equipped with State authority, and they are investigating the dairies throughout the State. I would again repeat the importance of keeping all milk at a low temperature, never letting it rise above 50°.

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[1] Albany Medical Annals, March, 1904.

In a recent discussion before the Congress of German Naturalists both Schlossman and Seiffert[1] referred to the injury which may result from the use of preservatives in milk. Hubner also condemned preserved milk. None of the chemicals commonly used for that purpose are wholly free from danger. Even peroxide of hydrogen is not without its objections. The addition of formalin as suggested by Behring checks lactic acid fermentation, but does not inhibit the growth of other germs. Formalin is, moreover, injurious to infants even in minute quantities.

Dr. Reynolds, Commissioner of Health of Chicago, is taking active measures[2] to shorten the time of transit of milk from the cow to the baby. He has already accomplished much in the effort to secure "twelve-hour milk." This is another very important step in securing better food for infants.

Some observations to determine the albumin content of whey are reported by Crulee,[3] of Chicago. With the increasing use of cream and whey mixtures it becomes important to know the exact composition of whey. Whey is a solution not only of lactose but also of albumin. The albumin of whey is of especial interest, because it is of the kind which most closely resembles the albumin found in breast-milk. Its most

[1] Medical Record, October 15, 1904.

[2] Medical News, October 1, 1904.

[3] Archives of Pediatrics, June, 1904.

important constituent, in fact, is albumin, which appears in three forms: casein, lactalbumin, and lactoglobulin. The amount of casein varies with the completeness of the curding. Since of these three albumins the casein is the one which offers the most resistance to the digestive juices of the alimentary tract of the infant, it is evident that the more thoroughly this is removed—*i. e.*, the more complete the curding—the more suitable will the whey be for infant feeding. The percentage of albumin found in whey varies according to different writers all the way from 0.86 per cent., as found by Koenig, to 1.02 per cent., as found by White and Ladd. Crulee's results differ materially from these figures, ranging from 0.2928 to 0.6616, the average being 0.5013. He gives in detail his method of examination. The preparation of the whey was as follows: The skimmed milk was heated to 106°, and the rennet added in the proportion of one grain to the quart. The milk was then stirred well for a moment and then allowed to stand without any agitation for thirty minutes. The curd was then broken up and removed by filtering through a wire sieve and the filtrate (whey) heated to 150° to destroy the enzyme. These differences in results are apparently due to a variety of causes, one of the most important certainly being the method of preparing the whey.

Some important study on the ferments of cows' milk has been reported by Lesperance, of Montreal. As the result of this study he believes that cows' milk contains numerous ferments. We are now in a position to say that we have determined definitely the presence of trypsin, of the lipasic and oxidizing ferments, and of a glycolytic ferment. There is, however, reason to expect further discoveries in this direction, and this is not improbable when the complexity of the nature of cows' milk is taken into consideration.

LARYNGOLOGY AND RHINOLOGY.

By CHARLES P. GRAYSON, M.D.

The Serum Treatment of Hay Fever. All rhinologists and probably a very large number of general practitioners have alike been watching with much interest during the past summer and fall the treatment of hay fever with the recently introduced Dunbar serum. In last year's issue of this volume I gave a complete description of the methods employed in the preparation of this serum, and of the clinical experiments that Dunbar himself had made with it previous to placing it in the hands of others. Although somewhat costly, quite a sufficient supply of it has been obtainable since last spring to permit of a pretty fair test of its prophylactic and curative powers. We have had reports in many medical journals from a number of investigators, and, in addition, the treatment has been discussed in several of the county and State medical societies. Of course, we all know that whenever a new remedy of any apparent promise is introduced to combat a disease of any degree of prevalence there is an inevitable group of men who make a hasty and superficial trial of it, and then hurry into type with accounts of their cases and deductions therefrom that are not worth the ink with which they are printed. Some three or four years ago we had a small flood of this sort of literature anent that absurd mixture called liquor ambrosia. Some of us smiled when we first heard it modestly announced as a "great discovery," and then waited with amused confidence for the columns of amazing cures that, in spite of its worthlessness, we knew would follow quickly upon its introduction. We were not disappointed, nor have we been in the same expectation concerning the Dunbar remedy. We have been regaled with descriptions of the almost magical cures of a number of chronic neurasthenic sufferers from hay fever, who stay cured, however, only for the few weeks that the mental effect of the remedy lasts. This is the sort of patient who can always be depended upon to be cured for a time by impressing him with the novelty and the infallibility of any method of treatment. I have no intention of ridiculing the Dunbar antitoxin itself, but only those very premature individuals who, upon so short an acquaintance with it, consider themselves justified in terming it the long-waited-for specific.

To realize how far, how very far, it is from being anything of this kind, we need but study a few of the very large number of cases in which it has failed to afford the slightest relief. These are the patients in whom the neurotic factor of the disease has been but slightly in evidence, in whom the controlling effect of the imagination has been wanting, and in whom the element of faith was too feebly developed to extend any material assistance to the remedy. It is in the treatment of such neutral subjects as these that the actual value of the remedy has been weighed in the balance and found wofully wanting. Dunbar's theory that hay fever is the result of a systemic intoxication, and that the toxic material is contained in the proteid bodies found in the different flower pollens, is a very plausible one, and, better than this, it is very probably true. He has, beyond any doubt, succeeded in obtaining from these pollens a toxin of which a drop or two placed in the nose or within the conjunctival sac will in a few moments develop a group of typical hay-fever symptoms. He has also by a series of animal inoculations with this toxin procured an antitoxic serum that will promptly neutralize its effects. This has been demonstrated, and it is very interesting, and, to a certain extent, encouraging. It is, perhaps, a step in the right direction, but it is, I fear, but a step. What we are waiting for is an antitoxic serum or an antitoxic anything that will arrest an attack of genuine hay fever as well as an artificial one, and that will be as powerful a prophylactic as a curative. So far from finding this in Dunbar's pollantin, I say again this year, as I said last, that it has absolutely failed to justify its claim that it be regarded as a specific. For every lonely case which it has seemed to relieve or, perhaps, for a time long enough for the optimist to write a hurried report, to cure, a score of others can be cited in which it has proved utterly worthless even as a palliative. It has, in fact, proved of no more value than, if as much as, the cocaine and adrenalin combinations that so closely preceded it. And why, may we not ask, should this Dunbar serum treatment be regarded as rational? Is it, indeed, anything more than a mere treatment of symptoms? I have always thought that the one and only rational treatment of hay fever was that which attempted the abolition of the constitutional factor of the disease. If treatment directed to this end were successful the hypersensibility of the upper mucous membranes would be so completely removed that the pollen or other exciting cause of the disease would encounter a tissue calmly indifferent to its presence and from which it would elicit no sign of irritation. Any system of treatment that could achieve this would certainly be deserving of the term rational. It would be only such a result as this, such an increased tolerance and stability of the mucous membrane and its nerves that they will be possessed of no more than a strictly normal sensibility, that would represent a genuine immunity against this disease. And we may as well recognize now as later that such a radical change as this can only be gained through hygienic and general measures. We cannot stamp out constitutional and temperamental peculiarities by administering drugs or antitoxic serums. These may, perhaps, lessen somewhat the intensity and duration of the commotion induced by atmospheric irritants, but we cannot reasonably expect from them much, if anything, more than this. If it is a real immunity that we are looking for, it is not within the pages of the *Pharmacopœia* or through the inoculation experiments of the laboratory that we are going to find it. Hay fever is not that kind of a disease. It is an idiosyncrasy, an individual susceptibility with which we have to deal, and not with an organism or a substance that is universally poisonous. And there is another phase of this disease that should be very constantly borne in mind while we are endeavoring to discover a cure. It is not in all cases that some variety of pollen is the exciting cause. There is a certain number of people, and by no means a small one, in whom the attack is precipitated by the inhalation of some emanation from the horse, the cat, or some other species of animal. Among the victims of this disease whom I have treated there have been several who were entirely unaffected by anything of a vegetable nature. They could stroll with undisturbed serenity through meadows thick with flowers, or fields of hay or rye, or lanes bordered with golden rod or rag-weed, and yet the moment they ventured to drive in an open vehicle, even were it through the verdure barren streets of the city, the scent or some other effluvium from the horse would plunge them into all the miseries symptomatic of this disease. I have known an attack occasioned in this way to endure for a week or ten days. And it is to be added that these people could go over the same route in an automobile or on a bicycle without the slightest intimation of any nasal or ocular disturbance. Now, what can we expect Dunbar's serum or its derivative powder to do for cases like these? Such cases may be called vasomotor rhinitis instead of hay fever, but is there any symptomatic difference? For myself, I am at a loss to understand the applicability of the term "rational" to this method of treatment, and I am convinced that the only treatment worthy to be so designated is one that will reorganize the patient, so to speak, and so steady the sensory and vasomotor nerves of the upper air tract that he can live in an atmosphere of pollen without so much as a sneeze. I am quite willing to admit, in fact, I insist, that to effect such a change is apt to require months of patient and unremitting care and self-denial upon the part of the sufferer from the disease, but that such a result is possible I have seen a sufficient number of cures to make me firmly believe. The prophylaxis of the disease should not be deferred until the patient's nervous condition is ripe for its establishment, but it should be begun almost in the cradle. The child who is born of neurotic parents in either of whom there is a history of hay fever or asthma should be developed physically rather than mentally, should be trained as an athlete rather than a scholar. The emotional element of his character should be stunted in every possible way, and, if he is to escape the nerve storms and distresses of his parents, it were better, during the earlier years of his life, to bring him up as a healthy and untamed animal than as an intellectual human being.

The Accessory Nasal Sinuses. During the past year there has been the usual abundance of literature concerning the acute and chronic suppurations of the accessory sinuses. We have been still further instructed as to their causes, their symptoms, their pathology, and their treatment. Concerning the latter, ease and completeness of drainage is, of course, the primary consideration; but having determined upon this we may, perhaps, be somewhat bewildered, and lose more or less valuable time if, instead of relying upon our own surgical sense and skill, we stop to choose from among the many different methods of operation that have been proposed by others. Of course, the differences that distinguish them are mostly mere matters of detail, but it is these usually trivial distinctions that have led to an unnecessary multiplication of instruments. The man who knows his anatomy and who has acquired a proper amount of manual skill is not apt to be dependent upon any unusual refinement of instrumental assistance, but for those who may be lacking in either of these qualifications there are especially devised drills and perforators and cannulas without end.

Among the whole year's output of papers dealing with this subject it has seemed to me that the one that has put the whole matter in a nutshell and that has given us the kernel of basic truth that we want is that by J. Mackie,[1] entitled "Notes on Nasal Suppuration." It opens with four propositions:

1. That the essential cause of nasal suppuration is defective drainage.
2. That defective drainage is mainly due in childhood to adenoids and lymphoid hyperplasias.
3. That later it is the result of hypertrophies and deformities resulting from lymphoid hyperplasias during the period of active growth and development.
4. That by adopting this view of the natural history of nasal suppuration the whole subject becomes more intelligible and a simpler and more rational treatment becomes possible.

In reviewing this article I repeat very frequently his own words. In support of the first of his contentions he calls our attention to the well-recognized fact that "from earliest infancy to adult life the nasopharynx is a region peculiarly liable to catarrh and hyperactivity of lymphoid tissues," and that this implies that for a considerable period of early life, while the growth and development of the nasal cavity is being effected, the nasopharynx is in a state of active congestion, its mucous membrane being bathed with purulent or other irritating discharges. He fears that, although in connection with the existence of adenoids, we may be fully cognizant of the narrow and highly arched palate, the gaping mouth, and the look of stupidity which comes from habitual mouth breathing, we are yet apt to overlook or to belittle what is, perhaps, of more serious import—the malign influence of early nasopharyngeal disease on growth and nutrition. Systematic investigation of this point that takes advantage of every opportunity to inform ourselves of the early history of people with normal noses will demonstrate, he thinks, that few if any of them have suffered from catarrh for any significant length of time during their childhood. Whereas, on the other hand, if we analyze our cases of septal and turbinal distortion, our chronic smouldering empyemata, and above all our cases of ozæna, we will never fail to uncover a history of prolonged nasopharyngeal trouble in early life. He refers, in addition, to the frequency with which certain young adults are brought to us for sinus or other intranasal mischief upon whom a number of years previously we have operated for adenoids.

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[1] Journal of Laryngology, Rhinology, and Otology, October, 1904.

It is because these postnasal vegetations are a disease of very early life and that parents are usually slow to recognize their existence that children are seldom brought to us for treatment before a number of intranasal changes have been produced by them which a simple clearance of the nasopharynx is too late to remedy. It has long been Mackie's custom when such cases are brought to him to carefully examine the nose, and in the event of his finding any considerable obstruction he endeavors to deal with it at the same time that he performs the adenoid operation, the part usually receiving the major portion of his attention being the head of the middle turbinal.

In those instances in which it is possible to combine the two operations this custom will, no doubt, meet with general approval, but unfortunately these are but comparatively few in number, and in the others in which one operation must precede the other by, perhaps, some days, it is better, I think, that the nasal obstruction should be removed first. Being ignorant of their relative difficulty, the parents almost invariably regard the removal of the adenoids as the major operation, and it is upon the performance of this that they expect immediate and more or less complete relief of all the symptoms. If this, however, be not promptly apparent because of coexistent intranasal obstruction, the disappointment of the parents may lead them to discredit the value of our surgery, and, in spite of our explanations, to decline anything further of that nature.

In speaking of *ozæna,* Mackie expresses the opinion that almost if not all cases originate in early chilhdood, and that they are due to the conditions that interfere with proper nasal drainage. Should this view be correct, then, he thinks, an ordinary case of ozæna will afford eloquent testimony as to the influence of foul discharges or development. "Taking an average fairly severe case the middle turbinal will be found in its anterior half broadened, pressed against, and seemingly incorporated with the outer wall. Its posterior half is even more hypertrophied, often twisted on itself, and curled backward and upward. In extreme cases, where the face is flattened and the spheno-ethmoidal recess shortened, it may be found pressed against the anterior wall of the sphenoid. It is very easy to see in such a case how drainage is interfered with. The outlet from the posterior ethmoidal and the sphenoidal cells is blocked, while the spheno-ethmoidal recess itself has become practically a closed cavity." It is entirely reasonable to suppose, should the view that nasal suppuration has its origin in the nasopharyngeal diseases of childhood be regarded as the correct one, that its first indications would be met with in the region of the middle turbinal and the ethmoid cells.

In passing to the consideration of *sinus disease,* Mackie takes occasion to say that it is because the study of the diseases of the nasal sinuses began with those most easily within reach of the general surgeon that the idea still prevails that the maxillary and frontal sinuses are those most frequently affected. As a matter of fact, he thinks that an enormous preponderance of all cases of sinus disease have their seat in the ethmoid. He has no desire, however, to enter upon any discussion of this point, his one aim being to concentrate our knowledge of straggling facts and to arrive at some practical common-sense view of the situation which shall offend neither our conceptions of normal nor of pathological anatomy, which shall be explanatory as far as causation is concerned and helpful as far as treatment is indicated. To facilitate this, he thinks it far better, instead of studying the different sinuses as individual and distinct cavities, to look upon them as massed together and as being interdependent parts of the composite skull. If we agree to this, and surely few of us will not, it becomes evident at once that the centre of such a system must be the region of the middle turbinal. "Here the various sinuses open, through here all discharges must pass, and here disease or obstruction, by all the laws of surgery, will surely lead to disease in the parts beyond. And if we except a few cases of antral disease of dental origin, probably almost all our cases of nasal suppuration do so originate."

Although he recognizes the frequency with which the frontal sinus is the seat of disease, yet the author intimates his belief that this is merely the accompaniment in most cases of anterior ethmoidal suppuration.

The same idea governs his attitude concerning disease of the sphenoid, which, he thinks, is more common than that of the frontal, and is practically always associated with posterior ethmoidal mischief, "the victim of which has but to lie upon his back to get a drip of infecting pus into the sphenoidal opening." As to antral disease, while admitting the occasional infection of the cavity from dental sources, he thinks the proportion of such cases greatly overestimated, and that much the greater number arises, as in frontal and sphenoidal disease, from conditions obstructive or infective within the nasal passages. This, he contends, and with excellent reason, is strikingly seen in many cases in which antral suppurations, which had persisted even after so-called radical operations, rapidly disappeared when disease in the middle and upper regions of the nose was dealt with.

Mackie's observations concerning ethmoidal disease merit full repetition here, and permanent preservation within the pages of this volume. They follow: "It is a convenience to divide ethmoidal cases into anterior and posterior—not, however, because of mere anatomical considerations, for which, perhaps, it is possible to have a too slavish regard. As our experience broadens, we soon see how often nasal suppurations laugh both at anatomy and physiology, the presence of pus in any particular region of the nose being about as deceptive as the position of pain and as uncertain as a safe guide to the true focus of disease.

"With reference to disease of the posterior set of cells, of all nasal suppurations perhaps the earliest and the most common, the characteristic symptom is postnasal catarrh. This time-honored term covers a set of symptoms which has been a fruitful source of worry to the physician down the whole history of our art. With its simple forms we are all familiar, and they need not be further considered here. I should like, however, to draw attention to a type less common, perhaps, but of which a full knowledge is essential not alone to the rhinologist, but to the family doctor and practising physician. I refer to those cases in which the constant foul drip from the diseased posterior cells has infected not only the pharynx and larynx, but even the trachea and bronchi, where a set of symptoms has been set up, which, along with the depressed health and occasional elevation of temperature, is often mistaken for phthisis. In these cases it is not a question of irritation and cough from the mere physical presence of pus, but a genuine and specific infection from above. I was able to verify this in some of my cases, where a profuse purulent discharge could be seen bathing the larynx and clinging to the side of the trachea, a discharge similar in every way to that which was found on the back of the palate and oozing from the posterior nares.

"On several occasions I have remarked the muddy brown nature of this pus, and an odor varying from a faint, sickly aroma to the full fœtor of ozæna."

In illustration and support of his convictions concerning ethmoidal suppuration, the author details several cases the approximate duplicates of which most of us have seen in sufficient number to make us readily willing to grant the justice of his views and to accept as entirely rational his suggestions concerning treatment. I cannot too strongly advise every rhinologist to read in the original and to almost memorize every word that Mackie has written upon the subject of treatment. Nothing better and of greater practical value has been written not only within the past year, but within the past decade. I can but give a few extracts here, but I am sure that these will more than justify my high opinion of the original and lead to the adoption by many of my advice that it be carefully read. He premises that the general principles of surgery hold good in the nose as elsewhere, and must not be ignored. The general surgeon who meets with an inflamed and suppurating area with pus channels ramifying among the tissues will be satisfied with nothing short of a thorough exposure and drainage of the whole diseased area. It should not be otherwise with the rhinologist, and unless he bear this constantly in mind and carry it out in practice, his results in treatment are not likely to be very satisfying. The author, judging from his own early work, and, to some extent, from what he has seen of the work of other surgeons, is convinced that tinkering surgery in the presence of advanced sinus disease is productive of more harm than good. "If we do not feel sure of our ground, if we are not satisfied that the confidence of our patient will stand the strain of a tedious and painful course of treatment, if we are not ourselves prepared to go fearlessly on with our case straight to the end, it were better for our patient that we altogether held our hands."

There is usually a great difference both in the mode and duration of treatment between cases that are of comparatively recent origin and those that are of long standing. In the former, which may have ensued upon an attack of influenza or have been the outcome of even a severe ordinary cold in one in whom the drainage of the middle meatus is obstructed, a complete and prompt cure may generally be anticipated upon the removal of the obstruction. In the latter, however, when the passages have become blocked by bony deformities, polypi, and redundant soft tissue, we cannot but expect that progress will be slow. In such cases the author, like the rest of us, has often found it necessary to operate twice, and, not infrequently, three times under a general anæsthetic before effecting a cure.

With reference to his meaning in the use of the word "cure," what Mackie says is again worthy of complete reproduction:

"I may here state that in using the term 'cure' I do not necessarily mean that the last vestige of discharge has ceased. After all, discharge is only a symptom, and by no means the symptom most painful or dangerous to the patient. The surgeon who takes his stand on the symptom of discharge alone, and whose prime consideration is to secure its complete cessation, runs the danger of holding his own skill and his own mere technical results of higher importance than the welfare of his patient. By extensive, perhaps dangerous, operations and the removal of great masses of tissue, an early drying up of the sinuses may be secured, but a nose so treated has to a large extent lost its functional usefulness, a condition of affairs that must ever be greatly deplored. I feel very strongly on this point, and think that in cases of extensive disease, where there is no pressing evidence of extension of infection, we ought to move slowly in treatment, first establishing free drainage through the main pathways of disease, then watching and waiting until it becomes evident what parts are hopelessly diseased, what parts show evidence of returning health, then at a subsequent operation dealing with the hopelessly diseased areas. By proceeding in this way *we conserve much that otherwise would be sadly missed in the future of the nasal economy.*"

In spite of this emphatic counsel that the author gives us as to the conservation of functionally useful tissue, he strongly deprecates any faint-hearted style of operating when we have satisfied ourselves that we have to deal with extensive disease of the posterior sinuses and when the passages are obstructed by masses of diseased middle turbinals. It seems to him, as it probably does to most of us, that the physiological efficiency of the nose is much less reduced by operations upon the middle than upon the lower turbinals. He has observed, in many of his cases of extensive ethmoiditis that have been cured by proportionately extensive operation, that the passages return to almost their normal appearance, and he is inclined to attribute this happy result not only to a certain degree of contraction of the framework of the nose, but also to something that looks very much like regeneration of tissue. "These considerations and the impossibility of effectively dealing with the posterior group of cells until a complete clearance has been made in the middle meatus have led me to use more energy in operating here than elsewhere in the nose." That which he terms the "complete" operation for suppurative disease of the posterior sinuses consists in the removal of the middle turbinal and the bold laying open of the cells with the curette. And he says that though this procedure may look a formidable one to the uninitiated, it is both simple and safe in the hands of the rhinologist.

In case the sphenoidal sinus shares in the suppurative process, his advice is that its treatment be left until later, but he has the best reasons for believing that if the complete operation for the disease of the ethmoidal cells has been performed, the sphenoidal sinus will be restored to health without further surgical interference. Should, however, direct treatment of this cavity prove to be necessary, there is but little difficulty in breaking down its anterior wall, and, thereupon, thorough drainage having been established, it will soon get well.

I am very glad that Mackie, in considering the anterior ethmoidal cells and the frequently associated disease of the frontal sinuses, takes occasion to express his disapprobation of the too often unnecessary performance of external operations upon these latter cavities. Some of us may be strongly tempted at times to enter the frontal sinuses by means of an artificial opening in their anterior wall. It may appeal to us because of its seeming economy of time and the avoidance of the tedium and trouble that necessarily attend the adoption of the intranasal route, but there are many considerations, some of which Mackie gives, that should lead us either to defer for a reasonable time or to abandon, if possible, altogether the external operation. His own words scarcely admit of satisfactory abridgement:

"In dealing with the anterior set of cells, the frontal often gives trouble. Let me here state that I am perfectly aware of the distress often caused by frontal suppuration; I am perfectly aware of the importance attached to its treatment, and of the ingenious operations devised for its cure by several eminent rhinologists. All the same, judging from my own experience, I am obliged to differ from them as to the frequent necessity for such heroic measures. Among my cases of nasal suppuration I have had not a few with frontal complications, but in only one have I found an external operation necessary. Of all the nasal sinuses the frontal surely is the one best adapted by nature for ridding itself of catarrhal secretions, and if it becomes the subject of empyema it can only do so by obstruction in the neighborhood of its ostium. By dealing thoroughly with this I think we will generally find it possible, not perhaps in every case to completely dry up the frontal discharge, but to reduce to a minimum and to remove pain and discomfort. I submit that a slight frontal discharge through a free ostium is a small matter, for which a dangerous and disfiguring operation should not be lightly entertained. Were any rhinologist here unfortunate enough to become the subject of frontal suppuration, I think I may venture to say that he would be very much inclined to take my view of this matter."

As regards *antral suppuration*, the author, while admitting that a certain proportion of all cases is due to dental mischief, maintains that a much larger proportion arises from the same causes as sphenoidal and frontal disease, viz., to obstructive or infective disease in the neighborhood of the natural opening. In those cases that present no abnormality within the middle meatus and that are clearly due to a carious or otherwise diseased tooth, the removal of the offending object followed by a week or two of drainage and daily cleansing will almost invariably lead to the arrest of the discharge. On the other hand, in the many cases in which there is evident persistent obstruction within the middle meatus and where a dental causation can be definitely eliminated, nothing curative can be hoped for from simple drainage, however complete, through the alveolus or the canine fossa. If, however, this be accompanied by the removal of the meatal difficulty, a cure is usually obtained very promptly. The histories of several cases of exceptional interest are related at this point by the author, and they serve to make even more apparent and forcible the wisdom and practical worth of his statements.

The lesson that he has learned from these cases, and which it will profit every one of us to learn also, is to place more reliance upon the restoration of the health and normal spaciousness of the middle meatus than upon simple drainage of the diseased antrum through one or other of the usual artificial openings. It is now his rule, even in the most chronic cases, to first remove all disease above or in the immediate vicinity of the ostium maxillare, and then to content himself with an opening in the canine fossa of only sufficient size to enable him to explore the diseased sinus and to provide for its medication and uninterrupted drainage.

The author concludes his paper with the remark that "the interesting points in connection with the subject of nasal suppuration are so numerous that the difficulty is, not in knowing what to say, but in knowing when to stop." We cannot but regret that he stopped so soon, but within the limits to which he confined himself he has given us far more valuable instruction and suggestion than is contained in the score or more pretentious papers that the year has brought forth. I am sure I need offer no apology for the very complete review of it that I have here given.

Killian's Operation for Chronic Frontal Sinusitis. For those who are possessed of but little manual skill or who are unable to attain the delicacy of technique that is essential for the performance of the intranasal operations by which we are enabled to drain and medicate the accessory sinuses, or, perhaps, for those who prefer the crude and disfiguring methods of the general surgeon, the following brief description of Killian's operation will be of service. In the thirteenth volume of the *Archives of Laryngology and Rhinology* there are two papers dealing with this operation, one by Killian himeslf and the other by Krauss, a former assistant in his clinic at Frieburg. They are both illustrated, and explain quite clearly the various details of the operative procedure. From the commencement of his work upon this sinus it has always been

Killian's endeavor to so improve the surgical methods for the cure of chronic frontal sinusitis that they would not only accomplish a complete and permanent cure, but that they would also give the best possible cosmetic result. Krauss describes very fully and accurately twelve cases, the first of them having been operated upon in 1896. At that time Killian had become convinced that only by sacrificing the anterior wall as well as the floor of the frontal sinus could a certain cure be expected. "Only such a radical proceeding," he says, "is in unison with the principles of modern surgery with regard to the treatment of abscesses in rigid-walled cavities." To change this somewhat complicated cavity into a flat surface, he found it necessary to completely obliterate its bony walls, and by making a resection of the frontal process of the upper maxilla the cells of the ethmoid, which are nearly always affected, were rendered accessible. This method demands absolutely the resection of the entire anterior wall of the sius. Its floor, that is, the orbital plate of the frontal bone, is also completely sacrificed in all patients. This extensive destruction of its walls permits an unobstructed view of the most remote recesses of the cavity, and it also makes it possible for the orbital contents to share in the refilling of the large space thus opened.

A very, if not the most, important detail of the method consists in preserving the upper edge of the orbit in the shape of a bony margin or crest. From a cosmetic point of view, this is probably the most important feature of the operation, and, moreover, by being careful not to remove the periosteum beyond the insertion of the tendinous fibres of the trochlear ring, double images can nearly always be averted.

Killian, recognizing the constancy with which the anterior ethmoidal cells are implicated in chronic abscess of the frontal sinus, insists upon the necessity for the resection of the frontal process of the superior maxilla in order that they shall be thoroughly exposed. Along the channel thus provided easy access is also obtained to the sphenoid sinus. The anterior extremity of the middle turbinal is quite uncovered, and, upon the removal of this, a large communication between the frontal sinus and the corresponding nasal fossa is established. It is advised that the nasal mucous membrane be saved and utilized in forming a flap to cover the defect. Finally, the wound is sutured either immediately upon the conclusion of the operation or a few days later.

After a careful study of this operation and the results obtained by it, I cannot help regarding it as one that would be apt to be employed only by the general surgeon, who is unfamiliar with or inexpert in the intranasal procedures of the specialist, rather than as one that would commend itself to the skilled rhinologist. It impresses me as being the very extreme of radicalism. If one's own experience with these cases of frontal-sinus suppuration has not been sufficient to convince him that such extensive destruction of the walls of the cavity is both unnecessary and injudicious, the reading of Mackie's paper and the study of his cases should be quite enough to lead to that conviction. It is not to be denied that we may at long intervals meet with a long-standing and rebellious case that will refuse to yield to intranasal methods alone, but I can scarcely conceive of one in which these, in combination with an external opening of just sufficient size to permit of the thorough curettage of all diseased tissue, could fail to accomplish a cure. I need scarcely emphasize the fact that by intranasal methods I mean, in common with Mackie, the complete removal of every vestige of diseased and obstructive tissue from the middle meatus. This, of course, implies the opening of the ethmoidal cells and the establishment of perfectly free drainage from them as well as from the frontal sinus through its natural outlet. If this is done in connection with the eradication of all diseased tissue from the sinus itself, what more can "the principles of modern surgery" demand? Certainly, nature will ask nothing more, and I have yet to see a case that has failed to get well under this comparatively conservative plan of treatment.

There have been many other papers during the year dealing with the accessory sinuses, but few of them have added anything to our knowledge concerning these cavities or their diseases. Most of the authors have simply *réchauffé* the writings of Sims and Jacob, of Lathrup and Turner; have gone over the anatomy of the parts for the hundredth time; have rediscussed the best routes for entering the sinuses, and have disputed over some trifling and immaterial detail of operative procedure with as much heat as though they were announcing the birth of a new surgical principle. Such papers serve only to distract attention from the one object that should be the goal of every possible variety of operation—the free opening of the diseased cavity and the complete and rapid escape of its pathological contents. Each of us, in attaining this end, may be permitted to exercise his own personal preferences in the matter of instruments, routes of approach, and postoperative medication. It is the end only that permits of no modification.

Intratracheal Injections. Although the advantages of direct intratracheal medication are generally recognized and the benefit derived from it generally acknowledged, yet it is probable that it is still much less frequently resorted to as a means of treatment in bronchial and pulmonary affections than it deserves to be. In the October issue of the *Detroit Medical Journal* Willis S. Anderson has a paper on this method that should largely increase the number of those who employ it. He has made a large number of experiments on dogs to prove the absorbability of drugs by the bronchial mucous membrane, and to prove that a considerable quantity of a non-irritating liquid can be introduced into the bronchi without injury. After trying various fluids with a view to testing their relative virtues as vehicles, he found that olive oil could be regarded as entirely bland, unirritating, and in every way suitable as a vehicle for medicaments. Intratracheal injections afford a means for the direct introduction of remedial agents and for the bringing of germicides into actual contact with the affected tissues. His experiments have convinced him that they are absorbed into the circulation and act systemically as well as locally without taxing the stomach. Among the substances experimented with were the oils of eucalyptus, thyme, cinnamon, and gaultheria, which may be employed singly or in combination in strengths of from 2 to 5 per cent. in olive oil. He found that menthol has a distinctly local sedative action, and that this is somewhat increased when it is combined with camphor. Campbell's favorite formula is a sterilized mixture of camphor-menthol, 5 per cent.; oil of eucalyptus, 5 per cent.; guaiacol, 2 per cent., in olive oil. The syringe and solution should be warmed to body temperature before they are used. The usual syringe with a cannula of appropriate length and curve is used, and the ordinary dose is one or two drachms, which may be repeated in a few minutes. For the best and most prompt results daily treatments should be carried out. The injection should be made during a prolonged inspiration by the patient, and although it may be made with no other aid than the holding out of the tongue, yet it is better that the syringe be introduced under inspection by the use of the laryngoscopic mirror. Anderson advocates the employment of these injections, in the congestive stage of acute bronchitis, the so-called "winter coughs," asthma, and, except in its advanced stages, phthisis.

Blood Poisoning from Tonsillitis. In the *Lancet*, October 15th, Owen reports a case many duplications of which have probably occurred in which the toxic role of the tonsillar inflammation has not been recognized. It is to encourage the almost routine examination of these glands in cases of sepsis without other evident cause that the report of this case is introduced here. The patient was suffering from a very severe sore throat. Both tonsils were swollen, and a patch of exudate was observed on the left, but a bacteriological examination failed to reveal either diphtheria bacilli or streptococci. Fluctuation was discovered later in the left tonsil, and incision gave exit to a quantity of pus. Thenceforward the condition of the thorax improved, but the temperature, in spite of repeated sponging, continued to rise until it reached 104.7°. The chest was filled with rhonchi, the abdomen became distended and tympanitic, and the tongue dry. The patient grew weak and tremulous, and his mind began to wander. Two days later the left knee had swollen, and there was evidence of effusion on the inner surface of the joint. The following day sweating appeared and the delirium increased. A blood examination discovered the presence of streptococci, but the Widal test was negative. Injections of antistreptococcic serum were now begun, but during three days of their use they had no apparent effect. Five days later the shoulder became painful, and there was soon noticeable swelling of the joint. Tubular breathing was heard over the left lung about the angle of the scapula, the apex beat of the heart had extended outside the nipple line, and a "slapping" second sound was heard in the pulmonary area. A second examination of the blood disclosed nothing abnormal. During the next several days Roux's serum was administered hypodermically, and, in conjunction with this, iron and quinine were given internally. The patient's recovery was protracted, but without further incident.

The frequency with which the collections of lymphoid tissue in the pharynx and fauces act as the pathway for systemic infection has been so often demonstrated within the past few years, that the early examination of this region should be much more a matter of routine than it has yet become.

Tonsillitis as a Cause of Nephritis. The attention of the general practitioner may be more strongly attracted to these glands and the wisdom of investigating their condition made more manifest by a report of J. L. Morse.[1] He describes four cases of acute nephritis occurring in children which were preceded by or arose during attacks of tonsillitis. His paper, and it is but one of many, affords us excellent reasons for believing that either mild or severe tonsillitis may be followed by nephritis, and it should dispose us to regard with much more favor the suggestion that inflammation of the tonsils may be a more frequent cause of Bright's disease than has hitherto been generally supposed. His advice, therefore, that the urine shall be examined during every attack of tonsillitis and that this examination shall be repeated several times throughout the period of convalescence, will be accepted as perfectly rational and judicious.

Laryngeal Tuberculosis. The past year's production of papers concerning this affection has not fallen below the average in number nor risen above it in quality. We are still awaiting a remedy that when brought into direct contact with the bacillus in the laryngeal ulcerations will promptly destroy it without at the same time destroying or seriously irritating the adjoining healthy tissue. Among the medicaments used for this purpose nothing better than lactic acid has yet appeared, but it is gradually being more widely appreciated that, preliminary to its application, the more careful and painstaking is the cleansing of the larynx, the more complete the removal of necrosed tissue and viscid secretion, the more gratifying will the effects of the remedy be. What is true of instruments is equally true of remedies. It is not the thing itself that counts so much as the head and hand that use it. It is not the gun, but the man behind it; and, therefore, it is the skill and thoroughness with which the larynx is prepared for the lactic acid and the skilled energy with which it is applied that contribute very largely to its therapeutic effect. The frequency of its application has also a great deal to do with its success, and, if it were possible to use it twice daily, its power to arrest extension of the disease and to promote cicatrization of the ulcerated areas would be much more noticeable. It was for this reason that I regretted, in a paper published some years ago, that we could not have a special hospital for those afflicted with laryngeal tuberculosis, one in which the house physician and his assistants would be qualified to carry out the local treatment of the larynx as frequently as might seem judicious. I am quite confident that such an arrangement would lead to a much larger percentage of cures of this disease than can be obtained without it.

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[1] Archives of Pediatrics, 1904, xxi

Another twelve months' experimentation with the x-ray somewhat strengthens our hope that in the course of time it may become of practical service as a means of combating tuberculous disease of the larynx. Among others, Tousey, in the *New York Medical Record*, September 3d, expresses the opinion that judicious application of the x-ray or of the ultra-violet ray and high-frequency currents is indicated in every case of tuberculosis, especially tuberculosis of the larynx. One such case is reported in which this mode of treatment was remarkably successful. The expectoration ceased within three weeks, there was great improvement of the voice, a marked gain in strength, reduction of temperature to the normal, and an increase in weight of about two pounds. There was, also, throughout the same period, a proportionate improvement in the condition of the larynx. The area of infiltration underwent a noticeable contraction, and a number of erosions, of varying depth, healed with a whitish appearance that seemed to be due to cicatricial tissue. The treatment consisted, first, in exposure to the x-ray once every four or five days, and, second, exposure to the Cooper-Hewitt light and application of high-frequency currents once in each interval between the x-ray applications. In applying the treatment to the larynx a specially constructed tube was used. This was held close to the outside of the larynx and the rays so directed that they would reach the exact portion of the tissue that they were desired to influence. No shield of any kind was required. The chief difficulty attached to this method of treatment is the stationary nature of the apparatus employed and the necessity which, therefore, exists for the patient to visit the office of the operator. In a rather large proportion of cases it is not practicable for the patient to do this. Possibly, in time, the apparatus may be so simplified that it may become of more general utility.

Primary Tuberculosis of the Pharyngeal Tonsil. D. M. Barstow[1] reports a case that does much to confirm our already strong suspicions of the tonsillar tissues as frequent portals of infection from the tubercle bacillus. Certainly this is a possible pathological role of the several tonsils in which it requires no great stretch of the imagination to believe. Barstow's case seems to have differed only in degree from the many cases in which the Koch bacillus has been discovered in abundance in excised faucial tonsils or in fragments of adenoid vegetations that have been removed by operation. In this instance there had been a cough, accompanied by pains in the chest and sweating, extending over a period of two years. The large number of bacilli found in the sputum would ordinarily have indicated a fairly extensive lung lesion. In spite of most careful examinations, however, no evidence of pulmonary involvement could be discovered. The very prompt subsidence, therefore, of the symptoms after the operative removal of the pharyngeal tonsil, together with the immediate and almost complete disappearance of bacilli from the sputum, go far to establish the belief that the tuberculous adenoid was the primary if not, indeed, the only lesion.

Laryngeal Crepitus as a Sign of Pulmonary Tuberculosis. Remouchamps[2] calls attention to the existence of this sign when there is not the least discoverable pathological sound over the chest by the ordinary auscultatory methods. It is of evident and particular value in those cases in which the bacillus is not obtainable, and in which the existence of fever precludes the employment of the tuberculin test. In eliciting it the patient, preferably erect, faces the physician with his mouth open. The latter places his right hand on the patient's left shoulder, and, resting his left thumb on the patient's chin, approaches his left ear to within two or three inches of the open mouth. A fine crepitation will then be perceptible, the maximum intensity of which will seem to be in the larynx, this organ amplifying the sounds which have their origin in the affected pulmonary parenchyma. The sound is approximately like that of a fine pen scratching a paper surface. It is audible in both inspiration and expiration, though more so during the latter. It increases or diminishes with extension or retrogression of the pulmonary lesion. In some instances it can be heard with the patient's mouth closed, even, at times, at a distance of several feet. The persistent absence of this sign, the author thinks, justifies rejecting the diagnosis of pulmonary tuberculosis.

Such suggestive papers as this should do much to increase the growing tendency to look more frequently to the upper air and digestive tracts for evidences of disease in their lower portions.

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[1] Medical Record, October 8, 1904.

[2] Medical Press and Circular, April 20, 1904.

The Serum Therapy of Ozæna. Although most of us are probably averse to employing forms of treatment of which the method of action is so slightly understood as this, yet the results obtained from the serum treatment of ozæna have in many instances been so gratifying, have, in fact, so often approximated complete cure, that we may be justified in putting aside both skepticism and prejudice and giving the remedy a fair trial. We can need no better reason for doing this than that, as yet, we have no other remedy, either local or systemic, that has been successful in so large a proportion of cases that we can resort to it with any other feeling than one of mere hope. There is no method of treatment, be it nutritive, alterative, or mechanical, that we can adopt with any real sense of confidence. The submucous injection of paraffin is no more than palliative in its results, its effect being merely to lessen the rapidity of crust formation and to diminish somewhat the size of the crusts. Even the most optimistic of its advocates can scarcely pretend that it has any regenerative influence upon tissues that exhibit any marked degree of atrophy, nor can it be claimed to exert more than a very temporary stimulation upon the nutritive processes of the mucous membrane.

For several other reasons, therefore, in addition to the frequent success that seems to have attended the use of antidiphtheritic serum in this disease, we should be encouraged to try it. Siziemsky has collected from the literature of ozæna 110 cases that have been treated by this agent. Of these, 22 per cent. are said to have been permanently cured; 6 per cent. almost completely cured; 37 per cent. improved; 24 per cent. temporarily improved. In 8 per cent. the result was uncertain because the treatment had been abandoned too early, and in 3 per cent. the results were negative. It appears, therefore, from this statement that diphtheria antitoxin is a remedy that gives favorable results in the majority of cases of ozæna in which it has been used. Although the theoretical basis of this treatment has not, as yet, been clearly defined, yet the clinical results obtained by it have been so satisfactory that it may be regarded as one worthy of a certain amount of respect, if not confidence. The author reports 2 cases of his own, in each of which he secured a successful result with this remedy. It is not in the resemblance of the germ of ozæna to that of diphtheria that the theoretical basis of this treatment should be looked for, but rather in the similarity in a chemical sense of the toxins of these two affections.

Nervous Symptoms Caused by Hypertrophy of the Lingual Tonsils. The role of the nose as a centre for an infinite variety of reflex nervous disturbances has, perhaps, been somewhat overdrawn. Many cases have been gravely reported in which some long-standing neurosis has seemed to be magically cured by the correction or removal of some more or less trifling abnormality within the nose. Too often the neurotic temperament of the patient and the strongly controlling influence upon its manifestations which is exerted by the confidence-breeding personality of the physician have been underestimated or entirely overlooked. Too often a successful result in patients of this type, which practically is little more than an example of "faith cure," has been solely attributed to the surgical removal of some imaginary disturbing lesion within the nasal fossa. Such cases are always entertaining, and, in a way, instructive, but they should always be regarded as cases of primary nervous disease to which the nose bears no etiological relation, but for the control of certain symptoms of which it may be used as an indirect therapeutic agent.

I should say that the cases reported by Jankelvitch[1] under the above title belong to this class. He enumerates the different symptoms provoked by hypertrophy of the lingual tonsil, especially in women, and asks if enlargement of this tonsil is alone sufficient to develop these nervous troubles, or if there must be a special nervous predisposition for the evolution of such affections.

The symptoms in his cases were the sensations of a foreign body in the throat, pharyngeal tenesmus, and reflex cough. In the first case the patient had a constant desire to swallow; in the second, to spit out some foreign body. The latter patient insisted that she could not prevent such attempts. During the menstrual periods the foreign bodies seemed to increase in size, the patients believing themselves affected with cancer. Most of the cases of this kind that have been observed have been between the ages of forty and forty-five years; that is, about the time of the menopause.

The cauterization of the lingual tonsils in those cases reported by Jankelvitch was sufficient to subdue all the nervous symptoms associated with them and which had resisted all other forms of treatment. In these patients, however, the symptoms of nervous disturbance were almost limited to the immediate vicinity of the lesion that provoked them, and, therefore, the curative influence exerted by the reduction of the tonsil was much more direct than it is in many of the operations performed upon the nose for nervous symptoms quite remote from this supposed seat of disturbance. In many of the cures of chorea, epileptiform seizures, and similar disorders that have been gained through intranasal surgery, we may entertain a reasonable doubt as to whether the result is not due rather to the effect of the operation upon the nerve centres than to the removal of a merely possible source of peripheral irritation.

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[1] Rev. heb. de laryngol., d'otol., et de rhinol.

Chancre of the Inferior Turbinate in a Child Aged Seven Years. In certain of its features this case reported by Brunn[1] is so almost unique that it should have a wide reading. The recognition of acquired syphilis in children, unless it stares us in the face, is often a matter of considerable difficulty, and is, at least, apt to be long delayed. The lesson taught by a case such as this, therefore, is that we shall leave no region unexamined that may contain evidence that will make an early diagnosis possible. The child was weak and sickly, and had enlarged glands in the left submaxillary region. There being no inflammation, however, of the tonsils, mouth, or ears, Brunn diagnosed scrofula. The nose externally seemed normal, and swallowing was painless. The glands continued to increase in size, and those of the other side became painful. Three weeks later a papular eruption appeared upon the forehead and shortly afterward upon the trunk and scrotum. One mucous patch was found inside the mouth, but no primary lesion could be discovered. The nasal fossæ were not examined until the glands about the hyoid bone became enlarged. The parents then recalled that at first the child had a coryza with bloody mucoid discharge from the nose, snoring, and difficulty in breathing. Internal examination revealed a small red and blood-stained ulcer with well-defined edges upon the inferior turbinated body, and some swelling upon the opposing surface of the septum. Under antisyphilitic treatment the child recovered slowly, the disease running a severe course and leading to a perforation of the soft palate.

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[1] Rev. heb. de laryngol., d'otol., et de rhinol., March, 1904.

OTOLOGY.

By ROBERT L. RANDOLPH, M.D.

EXTERNAL EAR.

Aural Herpes Zoster. Ordinarily herpes zoster is seen somewhere in the course of the distribution of a sensitive nerve. Paralysis of a purely motor nerve is rare. Sensorial nerves can also be paralyzed, and among the most frequent of this variety we recall disturbances in taste, following invasion of the chorda tympani in facial paralysis. Neuritis optica has also been seen in a case of frontal herpes, complicated with paralysis of one of the branches of the oculomotor. I do not know that I have ever heard of a case of paralysis of the acoustic and facial as a result of herpes of the auricle and neighboring parts, but such a case is recorded by Körner.[1] The patient was a man, aged fifty-five years, who had been operated upon for cancer of the breast, and following the operation he had suffered considerable pain all over the body. A vesicular eruption appeared on the right side of the head and neck, and eight days later hearing disappeared in the right ear, and there was facial paralysis. The herpetic eruption was located in the concha around the canal, above the auricle on the scalp, in the nape of the neck, in front of the ear, and on the face. The branches of the facial, which ran to the frontal and ocular regions, were entirely paralyzed, while those of the buccal region were only partially paralyzed. The chorda tympani was paralyzed. The drum membrane on that side was normal, although the watch pressed strongly against the ear could not be heard. Hearing of the other ear was all right. Treatment with faradization for three weeks caused a disappearance of the facial paralysis and an amelioration of the deafness.

Stenosis of the External Auditory Canal. Stenosis of the external auditory canal after exenteration of the middle ear is always a possibility which confronts the operator, and various measures have been suggested to avert such a mishap. These suggestions have come chiefly from Zaufal, Stacke, and Körner. None of these observers, however, can be said to have devised a procedure which is perfectly reliable, for notwithstanding the greatest care the canal will close up. Botey[1] has devised the following procedure: He makes an anterosuperior incision the entire length of the membranous canal out to the auricle, at the location of the anteroauricular groove, and between the superior border of the tragus and the root of the helix in the concha. In this space there exists no cartilage, and the section is easily made. In this way one obtains a meatus large enough to pass in the thumb in the case of an adult, and the index finger in children. In order to secure the permanency of this big meatus a metallic cone, slighly flattened and pierced with little holes and having a calibre of from 15 cm. to 22 cm. in breadth and from 16 cm. to 24 cm. in length, is introduced into this canal. The cone should remain in position for five or six weeks, sufficiently long enough for complete epidermization. It is well to introduce into the cone a mesh of gauze covered with vaselin. In this way, without disturbing the cone, we can renew the tampon and dress, so to speak, the cavities of the ear, without causing any suffering. Botey thinks from an æsthetic point of view the operation leaves little to be desired, for the large opening of the canal is entirely concealed by the tragus. The results obtained by this method are admirable, for we have obtained a large auditory canal almost invisible at first sight and by way of which we can detect the slightest sign of relapse.

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[1] Münchener med. Wochenschrift, January, 1904, No. 1.

Removal of Foreign Bodies from the External Auditory Canal. The removal of foreign bodies in all so-called fresh cases must be attempted only with the syringe, and if we do not succeed at the first sitting one or more trials (with a day or even more intermission) should be made with the same method unless serious symptoms demand the immediate removal of the foreign body. Leuter[2] is of the opinion that we may deviate from this rule only when there is a perforation of the drum membrane present, and the tube is wide, so that it is difficult to get a good *vis a tergo*—that is to say, a strong backward current of water, or when the foreign body is so soft that it can be safely removed with the forceps. If, after giving the syringe a faithful trial, we fail to get out the foreign body, we should, of course, attempt to remove it with the aid of a reflector and forceps. Generally speaking, this can be done without giving an anæsthetic in the case of adults, but in little children it is a rather hopeless job without a general anæsthetic. When our efforts at extraction have failed and much bleeding and swelling have resulted, it is well to wait until the canal has recovered its usual appearance and then to make a similar attempt; and only after this operation has been fruitless should we resort to the retroauricular incision. It is interesting to note the fact that foreign bodies of steel can be removed with the strong magnet. Such a case has come under my own observation where every attempt had failed to remove a steel ball (from a bicycle) from the external auditory canal of a little boy. The giant magnet was used with a prompt result. Shoe-buttons, which are sometimes introduced into the canal, have a metallic portion which might respond to the influence of the magnet. At least the trial could be made in case the syringe has failed.

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[1] Rev. heb. de laryngologie, d'otologie, etc., September 3, 1904.

[2] Archiv für Ohrenheilk., vol. lxi. p. 74.

Bearing upon the subject of foreign bodies in the canal, I would remind my readers that I have found peroxide of hydrogen the most valuable of the agents which are used generally for softening cerumen, so that it can be easily removed with the syringe. Strong solutions of bicarbonate of soda or of sweet oil have long been in favor, but my opinion of hydrogen peroxide has not changed since I first spoke on the subject a few years ago. I still regard it as much more effective than either of the agents just mentioned. Halasz[1] reports a case where hydrogen peroxide was used repeatedly in an external auditory canal which contained a bean, and where the well-known chemical reaction of the agent (formation of masses of bubbles) had the effect of forcing the foreign body out of the canal. Upon the basis of this experience he recommends that a solution of hydrogen peroxide in a 5 to 10 per cent. strength should always be poured into an external auditory canal which contains a foreign body, especially in cases where the syringing has failed to remove the latter.

I have always used the agent undiluted in cases of cerumen in the canal, and have simply instructed the patient to fill the canal two or three times and to allow it to remain in ten minutes, and as a result hardened cerumen is easily and promptly removed.

MIDDLE EAR.

Tuberculosis. I have spoken a number of times on this interesting topic, and I have generally taken a rather pessimistic view of the outlook in this disease of the middle ear. Hegetschweiler[2] reports several cases which induce me to take a somewhat more favorable view of this variety of middle-ear affection. I must confess that the majority of cases of middle-ear tuberculosis which have come under my own observation were in individuals who were about to enter the valley of the shadow, and the ear trouble was really a terminal event. Dreyfuss[3] reports seven cases, in all of which the local affection entirely disappeared as a result of improving the general condition through means of climate and internal medication. Local surgical interference was also resorted to in his cases, with a view of getting good drainage and so ridding the middle ear of tuberculous tissues. Hegetschweiler reports four more cases, and all terminated favorably. It stands to reason that treatment of the constitutional affection and the aural trouble must go hand in hand, and improvement will only be noted where the general condition improves. The author calls attention to the great value of high mountain climate. He has also found that the insufflation of fine iodoform powder after cleansing and drying the ear has given the best results in his hands.

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[1] Archiv für Ohrenheilk., vol. lxi. p. 102.

[2] Zeitschrift für Ohrenheilkunde, vol. lxiii..

[3] Ibid., vol. xliii.

Middle-ear Suppuration and Gastrointestinal Troubles in Infants. The fact may be recalled that several years ago I reviewed a number of communications on this subject. Meltzer, Ponfick, and others have made numerous autopsies on infants who had died of gastrointestinal trouble, and in most of these cases they found suppuration in the middle ear. They concluded that the aural condition was responsible for the persistence of the gastrointestinal disease, and consequently for the death of the child. One would expect that such observations would excite considerable interest everywhere, and that they would set on foot systematic examinations of the ears of infants affected with intestinal disorders. Strange to say, however, there have been at the hands of clinicians at least no reports in confirmation of the observations of Ponfick and others, and it is presumable that obstinate gastrointestinal troubles in infants are viewed in pretty much the same old way as regards cause and treatment; in other words, the theory as to the ear being a possible source of infection has not been entertained. I have no doubt but that the great difficulty of getting a satisfactory view of the tympanic membrane in a very young infant has stood in the way of making an examination of the ear. Even to an expert it is no easy matter to interpret the picture presented by a tympanic membrane of an infant a few months old. For the past two years there has been no allusion to this subject in literature, but very recently Barbillon[1] has returned to the subject and brings forward proof which goes far to strengthen the statements of Meltzer and Ponfick. He has made a systematic anatomical examination of the middle ear, and it is certainly surprising the frequency with which he found suppuration, although there was absolutely no clinical symptom of such a condition, and he is of the opinion that in the case of newborn infants who have been a certain length of time in infected surroundings and who die that an anatomical examination will be apt to reveal suppuration of the middle ear. In an examination of twenty-seven cases he found the antrum and middle ear filled with pus in twenty-five. He gives a very interesting clinical picture of these infants. When they first come to the clinic they are, generally speaking, in pretty good shape, though they are often somewhat feeble from premature birth. Still for the first few days after admission into the hospital one will notice an increase in weight. Suddenly, and as a general thing, about the eighth or tenth day and sometimes sooner the infant commences to vomit its milk, and a yellowish or greenish diarrhœa appears. The child then grows pale and has a tired look. In these cases it is usually impossible to find anything which could have caused the digestive disturbance. If there is any temperature change it is often at first seen in a subnormal temperature. In spite of the usual treatment for these digestive troubles, such, for instance, as a fluid diet and intestinal irrigations, the condition grows worse, and, finally, the child dies. At the autopsy one finds nothing noteworthy in the digestive tract, certainly nothing that will explain the symptoms but an examination of the middle ear will almost invariably disclose pus. As a rule, there is no perforation of the drum membrane, but the latter will be found to be the seat of deep changes. Inasmuch as otorrhœa is rare the presence of suppuration is not recognized during life; indeed, there is not the slightest local symptom which would excite suspicion as to the true origin of the trouble. No doubt an examination of the drum membrane at this stage might show changes, but, as I have said, it is an exceedingly difficult matter to get a satisfactory inspection of the drum membrane. The canal is very small, and the walls often lie in apposition, and the canal is not infrequently filled with desquamated epithelium. In the presence of so many cases of this character, considered as a general thing as primarily an alimentary disturbance and treated as such, and which are only septic infections of aural origin and which cannot be detected during life, but the existence of which is demonstrated at the autopsy, he is convinced that too much stress is laid upon the so-called pure and simple gastrointestinal infections of infants. The author gives some valuable information as to the diagnosis. While infants affected with the ordinary gastrointestinal disorder are consumed with thirst, we may expect the trouble to be of aural origin when the patient has complete loss of appetite and only *slight* thirst. Sometimes, indeed, the child refuses to drink. And we may come to this conclusion in spite of the presence of marked gastrointestinal symptoms. Again, in genuine gastroenteritis the infant cries violently, but when there is marked apathy or depression we must suspect that the ear is involved. Finally, the failure of the usual treatment, found to be so efficacious in troubles of the digestive tract, primarily will warrant us in attributing the condition to an infection which has its origin in the pharyngoaural region. These points are worth bearing in mind, and it would undoubtedly be well to subject cases with obstinate gastrointestinal symptoms to an examination of the ears by an expert, and when there is the slightest disturbance in the normal picture, together with the peculiar symptoms just noted, I would advise a free incision of the tympanic membrane.

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[1] Annales des maladies de l'oreille, de laryn., etc., February, 1904.

Hepatitis Resulting from an Infected Ear. Suppurative hepatitis we know, as a rule, is a metastatic affection; in other words, primary hepatic abscess is a very improbable condition. The majority of cases of hepatic abscess are due to infection from dysentery, or, perhaps, from gastric ulcer, or by metastasis from purulent foci either in the kidney or lungs. So far as I know no cases have been recorded where the liver trouble has originated in a purulent otitis. S. MacCuen Smith[1] has placed on record three such cases which are of exceeding interest, and which would at least demand a more careful examination of the liver region in our suppurative middle-ear cases where the temperature is pyæmic and where the usual indications for operation upon the mastoid are absent. Smith reports three cases in which the most interesting features were the following: The most notable early symptom was the acute exacerbation of a chronic aural discharge which, although usually innocuous in character in a few cases, became ichorous and pointed suspiciously to a possible systemic infection. The most constant and characteristic symptom was that of severe pain in the right shoulder and neck, which appeared synchronously with the commencement of hepatic suppuration. The manifestation of pain and tenderness in the right hypochondriac region indicated the hepatic origin of the trouble. The repeated chills, very high temperature (106°), and leaky skin showed that the process was septic in character and likely to prove fatal. The marked accessions and remissions of temperature were typical of a suppurative hepatitis, or multiple abscess of the liver. While jaundice was a constant symptom it appeared so irregularly as to be of little diagnostic value, except in a confirmatory way. The history of secondary infection is clear enough to justify the conclusion that a metastatic abscess of the liver or of other viscera may originate from a suppurative process in the middle ear.

Prophylaxis of Acute Otitis Media. This is a theme which should appeal to us all, and one which Veis[2] has touched rather lightly, though in a practical manner. Most individuals we know in order to clean the nose press the nostrils tight together and blow hard. In this way the outlets of the nostrils are almost hermetically closed, and when the pressure is very strong infectious material, which we so frequently have in the nasopharyngeal region, in scarlet fever, diphtheria, and measles, is driven up into the Eustachian tube and from thence into the middle ear. This method of clearing the nostrils certainly has its disadvantages, not to say dangers. It is no uncommon thing for us to feel distinct pressure in the middle ear when we blow the nose, so Veis suggests that the proper and normal way to blow the nostril is to leave the latter entirely open and free, and to make no pressure upon the outlets of the nostrils. He thinks that as soon as one gets accustomed to this method of freeing the nostrils of accumulations one will find it just as effective as the time-honored way with which we are all familiar. He is of the opinion that the old way of clearing the nostrils is responsible for many of the acute inflammations of the middle ear, and I think he is to some extent right. Attention might be called to the frequency with which we encounter otitis media from sea-bathing. Water gets into the nose and it is sneezed and coughed up, and in this way is frequently driven into the Eustachian tube and middle ear.

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[1] Archives of Otology, April, 1904.

[2] Monatsschrift für Ohrenheilk., 1904, No. 2.

Mooted Points in the Treatment of Acute Otitis Media. It is rather late to refer to an article which appeared nearly a year ago, but it came out after my annual report had been handed in, and is of such practical importance to general practitioners that I may be pardoned for referring to it. Brück[1] has given us a conscientious work based upon a study of statistics as to the actual therapeutic attitude, so to speak, regarding acute inflammation of the middle ear. The author has analyzed the important contributions of Politzer, Bezold, Grünert, Jansen, Körner, and others. From a study of these statistics one sees in the matter of incision of the drum membrane that these eminent observers are by no means in accord, and the same may be said as regards the postoperative treatment. Zaufal and Piffl, for example, are disposed to regard paracentesis of the membrane as indicated in only a few cases which present a certain train of symptoms, but the majority regard this operation as not only very useful, but indispensable. On this side may be found such men as Körner, Passow, Ostmann, Baginski, and Jansen. As far as my experience goes (as I have frequently stated elsewhere) I have never regretted this operation, for it certainly does not prolong the course of the disease; on the contrary, its tendency is very decidedly to hasten recovery. As regards the postoperative treatment, there is also some want of harmony. Many refrain from doing anything after the flow has been started, while others, as, for example, Bezold, and Politzer, believe in prompt irrigation and even in inflating the tube. While there is some division, then, among eminent aurists on these points, they are all unanimous, however, in condemning the insufflation of boric-acid powder, and most of them are against inflating the middle ear. I have always preferred irrigation, and have never employed the so-called dry treatment to any extent, though I have yet to see any harm come from it. I have discussed this point in previous reports, and have yet to find the record of any well-authenticated instance illustrating the danger of using powders in acute suppurative otitis media, though I recognize the theoretical danger. I have always spoken emphatically against the inflation of the middle ear in this condition.

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[1] Deutsche med. Wochenschrift, November 20, 1904.

Gauze Drain in the Canal in the Treatment of Otitis Media Suppurativa. In speaking of the treatment of acute suppuration of the middle ear I have stated that immediately after paracentesis it is my custom to introduce an aseptic gauze wick into the canal and to leave it in position for thirty-six hours and not to commence irrigations until this length of time had elapsed. Gradle[1] advises that such a wick be left in position throughout the treatment. As far as possible he sterilizes the meatus and auricle with carbolic-acid solution. The gauze wick is thoroughly impregnated with boric acid and introduced into the canal. A large dressing is then placed over the auricle. The external gauze pad is changed as soon as moisture shows, while the tampon may be left in from twenty-four to forty-eight hours at a time. He claims that in cases where the paracentesis has been done early this method of treatment will prevent the exudate from becoming purulent. We know in the early stage it is usually serous. In his experience there is usually a diminution in the discharge in from thirty-six to forty-eight hours. The length of time in some forty cases in which this method was employed varied from five to twelve days in the majority of cases, and exceptionally ran on to fifteen days. It is evident that the gauze drain to be effective must do its work in the early stage of the disease. Unfortunately in the majority of these cases we soon get an infected discharge, and while I have not employed this method it does not seem to me that the drainage can be as satisfactory as when the canal is left open and irrigated. I should think that stoppage and earache would occur. I feel sure, however, that if Gradle's instructions in general with reference to the treatment of this affection were successfully followed, especially with reference to early paracentesis, we would obtain prompt cessation of the discharge irrespective of the gauze drain, though the latter no doubt can be regarded as a reasonable suggestion. Instead of the borated gauze I have generally used an iodoform gauze ribbon passed right up to the drum membrane.

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[1] Journal of the American Medical Association, January 2, 1904.

The Employment of Natural Sulphur Vapors in the Treatment of Chronic Affections of the Middle Ear. Lajaunie[1] has employed this method with success. The vapors are driven into the ear through a catheter under pressure, which should, of course, differ in degree according to the indications. They can be employed even when generated at a very high temperature, and I gather, from what Lajaunie has said on this subject, that he prefers that the vapor be as warm as possible. This method is not applicable to purulent inflammation of the middle ear. It seems to be particularly indicated in the chronic non-suppurative forms, where the bougie and catheter have failed to relieve, and such a condition we find exemplified in the so-called sclerosis of the middle ear. The result of the treatment is seen generally in diminution of the subjective noises and improvement in the hearing. No doubt the vapors exert a most beneficial influence upon the catarrhal condition of the mucous membrane of the tube, to say nothing of its effect upon the sclerosis of the middle ear.

Osseous Necrosis of the Middle Ear. With a view of ascertaining the frequency and the cause of bone necrosis when of neither tuberculous nor syphilitic origin, Scheibe[2] gives us the results of a study of 35 cases of this character. Among these cases suppuration of the middle ear was the direct cause of death in 25 cases, and in these 25 cases osseous necrosis existed 16 times—that is to say, with a frequency sufficient to make one think that this condition plays an important role in the transmission of middle-ear suppuration to the interior of the skull. In 3 cases where the chronic otorrhœa was not the cause of death, the bone lesions did not have the character of necrosis. In 6 cases it was difficult to say whether the endocranial complication was due to the otorrhœa, and among these cases necrosis of bone was found only once. In 16 fatal cases where necrosis of bone was found the bone was exposed in 10, and there were sequestra in 7. The necrosis was more frequently found in the upper part of the middle ear than in either the cavity or the Eustachian tube, and the antrum was nearly always involved. Sixteen of the 17 cases were complicated with cholesteatoma, and in 16 cases the suppuration was fetid. It would seem, then, with absence of any other cause, that these two conditions, namely, cholesteatoma and putrefaction of pus, might be regarded as certainly important factors in bringing about necrosis. In all 17 cases there was retention of pus which was doubtless due in 12 cases to the presence of cholesteatomatous masses, and in 5 cases to masses of granulation tissue. He reminds us that bone necrosis is far more frequent in the clinic than in private practice, just as we would expect. For example, in 852 cases of chronic otorrhœa seen in private practice, the non-specific variety of bone necrosis was clearly established in only 7 cases, and none of these died. In all 7 cases there were cholesteatomatous masses and putrefaction of pus. A study of these statistics shows that in benign cases the retention is due most often to polyps, while in the grave cases it is occasioned by cholesteatomatous masses. It seems clear from this very important and interesting study that chronic suppuration of the middle ear, non-specific in character, is due to local causes, and it may be further said that suppuration only leads to necrosis in those cases where either retention occurs or where there is putrefaction of the pus, and that these two complications are to be found where suppuration itself is associated with the presence of cholesteatomatous masses.

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[1] Annales des maladies de l'oreille, etc., June, 1904.

[2] Archives of Otology, December, 1903.

The Question of Insurance in Connection with Acute and Chronic Suppuration of the Middle Ear. Suppuration of the middle ear should be considered as a matter of serious importance in this connection, and I have touched somewhat upon this subject in other reports. Of course, the chronic form more often comes up for consideration. According to Treitel[1] in the acute forms we should wait three months after recovery in order to avoid such mishaps as sinus thrombosis and brain abscess. In the chronic form cases of death are more often frequent from brain abscess and meningitis. Perforations of the upper part of the drum membrane and granulations in this locality, which indicate disease of either the bones or of the upper wall of the cavity or of both, are undoubtedly more or less serious conditions. From a study of his communication one might accept with some risk cases of otitis media which have been cured, and which present a cicatrized drum membrane, and even with perforation. In cases of persistent suppuration the nature of the discharge is very important. A purulent discharge accompanied with much odor, cholesteatoma, and granulations in the upper part of the membrane would justify refusal on the part of the company to insure. Deafness on both sides with vertigo make the risk much greater, and naturally the premiums should be higher. It is clear from all this that the importance of an aural examination of individuals presenting themselves for insurance cannot be overrated, and I think it highly important in these days, when grippe has so multiplied our cases of otitis, that more attention be paid to this feature of life-insurance examination.

Paracentesis. I do not want to be understood, with reference to this question of paracentesis, as advocating immediate paracentesis as soon as we encounter a case of otitis media acuta, for we all know that it is practically impossible perhaps to do an aseptic operation, and we always run the risk of transforming what might be a sterile exudate into an infected exudate. As long as the pain is bearable and there is no fever, and the color of the membrane is rather suggestive of a serous than of a purulent exudate, our treatment should be expectant; but when the pain becomes unbearable, preventing sleep, and when fever is present we can rest assured that nothing short of a free incision of the membrane is going to do any good. As regards this question of incision of the drum membrane, Burkner[1] makes some interesting statements which are based upon an exhaustive clinical study. He shows conclusively that cases in which incision of the drum membrane is done, early healing results far more promptly than in those cases in which the spontaneous rupture is allowed to take place. This accords entirely with my own experience. For example, 49.5 per cent. of the cases in which early paracentesis was done were well in five days, while only 5.4 per cent. of the cases which had ruptured spontaneously were well. He gives further data in this connection, which show that with the first twenty days 90.5 per cent. of the cases were paracentesis was performed had recovered, while of those which had been allowed to go on to spontaneous rupture only 43.4 per cent. had recovered. A study of his tables brings out the interesting fact that disturbances in function are far less frequent in cases where paracentesis is done than in the other set of cases. Relapses occurred in 8.5 per cent. of cases in which paracentesis was done, while in the cases in which the membrane ruptured relapses occurred in 20.7 per cent. But above everything else we must note this point: In cases where paracentesis was performed mastoid complication was met with in 1 per cent. of the cases, while this complication was seen in 7.4 per cent. of the other class of cases. I note, too, that in fourteen cases in which paracentesis was not performed the perforation never healed over, while in the other set of cases in which paracentesis was performed the perforation invariably closed. Burkner's observations are of great value, and they strengthen me in the opinion I have long held, that in all cases of otitis media acuta in which the pain is severe and the fever high, and which are accompanied with more or less bulging of the drum membrane, the sooner we incise the drum membrane the better from every point of view.

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[1] Deutsche med. Zeitung, December, 1903

Now as to the other side of this question. Zaufal[2] expresses himself in no uncertain language. He is no friend of this operation, and bases his reasons upon the assumption that acute inflammation of the middle ear follows a clearly defined course; in other words, is cyclic in character.

[1] Archiv für Ohrenheilk., Heft 3 and 4.

[2] Zeitschrift für Ohrenheilk., April, 1904, vol. xlvi.

When the bacteria which are present have reached their highest point of development, and the territory upon which they have been feeding has, so to speak, been drained of its nutritive properties, there occurs first, as in pneumonia, a subsidence of the inflammatory phenomena with disappearance of the temperature. The author has never been able to observe this cyclic evolution in a non-complicated case of middle-ear inflammation, and one should not, he thinks, interfere with this natural evolution by a paracentesis. When he had observed this cyclic course of the temperature he has been able to establish the presence of a pneumonia.

The Influence of the Cure of Suppuration of the Middle Ear upon Concomitant Mental Disturbances. At the meeting of the French Otological and Laryngological Society, held last May, there was an interesting communication upon this important subject by Toubert, of Paris. It will be remembered, perhaps, that Albert Robin touched upon this point twenty years ago, and since then there has been silence on this subject. Bouchut, Ménière, Williams, Catlett, Ball, and others have reported instances where the cure of an otitis which was associated with mental trouble was followed by distinct improvement, and even in disappearance of the mental trouble. In this connection Toubert recently reported two cases, both affected with otorrhœa, and in both cases the mastoid was opened according to the method of Stacke. He thinks a suppurating ear is undoubtedly a focus of irritation for the brain, espepecially when there is a strong tendency to mental trouble. Furthermore, this same focus can be the cause of disturbances in the neighboring circulation, or can be the source of origin of toxins harmful to the nervous system. A study of Toubert's observations would seem to indicate that in a certain proportion of cases disappearance of mental trouble has undoubtedly been brought about by the cure of a concomitant ear affection. Toubert suggests the possibility of a mechanical action, and thinks that several of the cases recorded could only be explained in this way.

I have in mind two cases where the individuals were excitable and peculiar to a high degree; indeed, in one case amounting almost to what is known as "flightiness." One of them was a woman aged thirty-five years, and the other a boy aged sixteen years. The boy had suffered from pretty constant otorrhœa for ten years, and the woman had had the same experience for seventeen years. The woman's disposition has been entirely altered since her recovery, and her manner has lost all its conspicuous excitability and nervousness, and her appearance now is that of a well-poised and healthy woman after three years, while the boy's development not only mentally but physically may be said to have started with the cure of his otorrhœa. Indeed, I think the matter of sufficient importance to warrant operative measures upon inmates of insane asylums who happen to be suffering with a chronic otorrhœa which antedates the appearance of the mental trouble.

Rhodan. It may be remembered that two years ago I reviewed the work of Jürgens on the occurrence of rhodan in the saliva. He found that in both the acute and chronic forms of suppuration of the middle ear the test for rhodan was negative, and the same results were obtained in acute and subacute inflammations of the middle ear. Positive rhodan reactions were only obtained in those cases where the condition of the ear was normal and where acute troubles had terminated favorably. To sum up his results, it was shown that the reappearance of rhodan in the saliva in cases of middle-ear disease indicates the beginning of recovery, and so long as this substance is absent from the saliva the middle-ear disease cannot be regarded as cured. The practical value of all this is obvious, as I pointed out in reviewing the earlier contributions of this writer. It seems to me to be a reliable method of ascertaining what progress toward recovery has been made by our treatment in this class of cases. His recent investigations fully confirm his earlier observations, and the test may be used in the course of our treatment to show just how we stand with regard to a cure; in other words, whether the condition is better or worse. When rhodan is unmistakably present in the parotid secretion of the affected side, it shows that the ear trouble on that side is well. When the test fails to show the presence of rhodan we have either a very serious or at least a very chronic suppuration of the middle ear. A weak rhodan reaction shows improvement, and may be a very useful guide. In cases of middle-ear inflammation where the disease has apparently run its course, and the perforation has healed over, if the rhodan fails to make its appearance we may be quite sure that there is trouble still lurking somewhere in the middle ear and the reappearance may be looked for sooner or later. The fact that we can avail ourselves of this test in cases in which it is very difficult to make use of an otoscopic examination certainly enhances the value of this diagnostic measure. Jürgens mentions the interesting fact that he examined the secretion of the parotid on the healthy side as well as the secretion of the opposite side, and where the middle-ear trouble had lasted for a long time and was rather serious in character, the rhodan was found present on the healthy side as well. There seems to be no way of determining what degree of inflammation produces this result, and he records a case where the rhodan reaction was stronger on the so-called healthy side than on the side of the affected ear. I feel sure that this test can be utilized to great advantage, especially in little children, where we are so often unable to successfully conduct an otoscopic examination.

General Treatment in Otitis Media. In the first place, an individual who is affected with an acute suppuration of the middle ear should drop all work and submit to a rigid hygiene, and I have always regarded rest in bed as of the highest importance. The great value of this latter measure is seen in the striking difference in the results of treatment of the rich and the poor. Members of the former class can be kept in bed and they get well with comparative promptness. The diet must be considered just as we consider this question in any other febrile condition. As regards internal medication, I simply treat symptoms. Sleep I induce by giving small doses of heroin, and make it a rule to see that the patient has regular stools. In children I think this is best effected by the citrate of magnesia. As an anodyne I have found a mixture of antipyrin and heroin a valuable one. It may be, as Lermoyez says, that acute inflammation of the middle ear is communicable, and I usually keep my patient in a room alone, and under no circumstances let another child sleep in the same bed.

The Home Treatment of Acute Suppuration of the Middle Ear. It seems to me that the method suggested by Beck[1] is a practical one, and not only would be useful to the patient as a so-called home treatment, but could be well used in office work. The armamentarium consists of a glass tube filled with sterile gauze strips and provided with a little beak at the top, which acts as a retractor for the tragus and also for the probe to get hold of the gauze. A whalebone probe, somewhat flexible at the end, is introduced into the tube, catches the gauze, and carries it well down into the canal, and in this way the canal is packed and kept comparatively dry. Beck's original intention was to thus facilitate the treatment of such cases at home by providing the patients with these little tubes filled with either sterile or medicated gauze strips.

Chronic Aural Catarrh. According to Grünert, the therapy of chronic middle-ear catarrh lies in internal medication. This opinion is based upon pathologico-anatomical changes. At any rate, all of us are daily confronted with disappointments in treating these cases with catheter, bougie, pneumomassage, pressure sound, and what not, and chronic middle-ear catarrh still remains "crux medicorum." The anatomical changes consist for the most part in the formation of new bone tissue throughout the ossicular chain. It will be remembered that some years ago I called attention to the fact that *thiosinamin* had been tried with benefit in this class of cases, its good effects being due to its well-known property of causing the absorption of exudates in tissues. Sugar[2] has recently taken up this question, and again employed thiosinamin in the treatment of this usually intractable class of cases. I need not go into the details of the cases, but will briefly relate Sugar's experience. He employed thiosinamin in eight cases of chronic middle-ear catarrh associated with negative Rinne, loss of lower tones, and prolongation of tuning fork through bone conduction, and in two cases of adherent tympanic membrane, following suppuration of the middle ar. In two cases of middle-ear catarrh and in one case of adherent drum membrane he injected once daily through the catheter five to six drops of the aqueous glycerin solution (10 per cent.) of thiosinamin. This was kept up for three weeks, at the end of which time it was clearly shown that not only had the drum membrane regained its mobility, but that the hearing had improved and the subjective noises diminished. In seven cases he injected a 15 per cent. alcoholic solution (three minims at a time) three times a week in the region of the mastoid process, and this was gradually increased until a complete syringeful was used, and then the injection was made into the upper arm, as this region was better suited for large injections than the rather thin, loose tissue in the mastoid region. When this stage was reached he made the injections every day, and kept it up for four weeks. No unpleasant results were noted beyond a slight burning in the neighborhood of the injection. He generally prefers to inject the 10 per cent. aqueous solution into the middle ear through the catheter, as the alcoholic solution causes very intense burning in this locality. Except in inflammatory conditions he is of the opinion that thiosinamin stands high as a remedy. One will certainly be struck with the remarkable improvement obtained in the hearing of some of his patients. In reporting on this subject three years ago I referred to the fact that I had noted unmistakable and permanent improvement in several cases of chronic aural catarrh in which I had used the drug in doses ranging from one-half to two grains three times a day. I have never, however, used it hypodermically, and I can readily imagine that this method would heighten its effectiveness. It seems especially indicated in the adhesive forms of middle-ear catarrh, in conditions where we have cicatrization following an old suppuration of the middle ear. The few cases which have been reported by Sugar speak strongly in favor of thiosinamin, and it is to be hoped that fuller experience will only serve to strengthen his opinion of this drug.

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[1] Medical Recorder, January, 1904.

[2] Archiv für Ohrenheilk., vol. lxii., Heft 3 and 4.

Myringotomy as a Means of Improving the Hearing. Operative measures in this class of cases (chronic aural catarrh) have long been practised, but with indifferent success, and while such men as Gruber, Politzer, Lucae, and others recommend operation I have never discovered any enthusiasm in their utterances on the subject. In 1898 Moure, on the basis of a series of observations, concluded that cases of middle-ear sclerosis which had resisted the usual treatment might be benefited by paracentesis, and in certain cases complete removal of the tympanic membrane had been followed by improvement in the subjective noises. Stefanowski[1] has been trying various forms of treatment in these cases, and he has tried, among other things, the effect of myringotomy, where the usual and stereotyped methods have failed. He reports a long series of cases from a study of which the following conclusions may be drawn. The operation seems to be entirely free of danger, and he advises its more frequent performance as a relief not only of the tinnitus but also as a measure calculated to improve the hearing. It is interesting to note the fact with reference to this last point that in 62.5 per cent. of his cases he obtained improvement in the hearing, and in 12.5 per cent. he obtained a complete cure. Miot, in his statistics, records improvement in 83.3 per cent. of his cases. One is impressed with the great improvement which these observers usually obtained in the tinnitus. The vertigo also was either completely gotten rid of or markedly ameliorated, this improvement showing itself in either a lessening in the number of the attacks or in feebler intensity of the attacks, and also in entire disappearance of the nausea and vomiting. The earlier the operation is performed the better. In only two cases did he find it necessary to remove a part of the hammer and the entire drum membrane, and in both of these cases he obtained a successful result. In all the cases the healing process ran a satisfactory and an uneventful course. In several of the cases which he examined as long as two years after the operation there was no closing up of the perforation. Of course, it is impossible so soon to estimate the permanency of the improvement, but it has been shown sufficiently well that the tendency of the operation is to do good, and that it is fraught with no danger to the patient. The fact is noted that the majority of his cases were men. In cases where a negative Rinne was obtained—that is to say, where the patient heard sound better through the bone than through the ear—he thinks that the prospect of getting improvement is very good, while cases of positive Rinne he rejects. I need not call attention to the importance in such an operation of getting asepsis of the field of operation or auditory canal. This may be best obtained, I think, by filling the canal for a certain length of time with pledgets of cotton soaked in an alcoholic solution of boric acid. Stefanowski gets anæsthesia of the operative field by soaking a small ball of cotton in cocaine and adrenalin solution, and allowing it to rest on the drum membrane for ten minutes. He makes the myringotomy by piercing the membrane in the lower and posterior segment. The opening is enlarged, if necessary, and the incision is carried right down to the periphery of the membrane, then upward along the periphery of the posterior border of the membrane, then across to the manubrium, and from this point straight down to the place where the incision was started. This flap is removed. The edges of the membrane are then cauterized with chromic acid. If after eight days no improvement has set in he removes a part of the hammer and gradually all of the membrane. Stefanowski gives the records of a number of cases, and from the results which he obtained in these cases I am induced to think that considerable benefit might result from myringotomy in certain selected cases. There is nothing to indicate that the operation with ordinary precautions is at all risky.

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[1] Archiv für Ohrenheilk., vol. xlii., parts iii. and iv.

Hot-water Douche in Chronic Aural Catarrh. Head[1] has found the use of the hot-water douche of great service in this class of cases. We all know, of course, of the treatment with the hot-air douche, but I am unable to find evidence to show that this method has accomplished much. Head's method is certainly worthy of trial. The treatment, as suggested by Head, is left entirely in the hands of the patient. The water used should be as hot as it can be borne without burning, and the technique is as follows: Either a specially small tip is ordered or a straight medicine dropper may be inserted into the tube of the fountain syringe. The fountain bag is hung from eighteen to twenty-four inches above the ear, or just high enough so that the water will be surely carried to the drum membrane. If the tip be small and the bag not too high two quarts of water will run for about ten minutes, and will remain hot for that time. It must be insisted that the patient feel the continual impact of the stream of water against the membrane, for it is easy for the ingoing and outgoing streams to neutralize each other so that only a small portion of the water reaches the membrane. He suggests that the treatment be used once a day, ten minutes for each ear. When the patient complains of dizziness from the injections the force of the water may be too strong or the water may be too hot or the treatment too long. These points must be kept in mind. In some cases he has used a demulcent solution to get rid of the dryness which is often seen in the external auditory canal after frequent washings.

But after all is said and done I must confess that nothing of any striking importance in connection with the treatment of chronic aural catarrh has been brought out during the past year, and the outlook is still quite unpromising. The mechanical treatment of these cases with time will probably be seen to play a more prominent part. I refer to massage. I cannot see, however, that in the many so-called improvements in the shape of masseurs we have gotten anything more satisfactory than the ordinary pneumatic speculum. The pressure probe or sound of Lucae in my experience is distinctly disappointing, and long-standing adhesions successfully withstand the attacks of both pressure probe and bougie. Goldstein[1] has found a 10 per cent. solution of camphor-menthol in benzoinol among the most valuable of the various agents for medicating the aural tract. A few drops of this solution may be injected through the Eustachian catheter and forced by compressed air into the tympanic cavity. Iodine, carbolic acid, and glycerin may be used in the same manner. I do not agree with Goldstein, however, in thinking internal therapeutics of little value. I have usually found that strychnine and iron were beneficial in these conditions.

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[1] Journal of the American Medical Association, November 12, 1904

THE MASTOID.

The Question of Heat or Cold in Mastoiditis. Experience has taught us that the question as to which is better in mastoiditis, a hot or a cold application, is often satisfactorily decided by the patient. Some can only stand heat and others only cold. It is recognized generally that the favorable action of cold applications is best seen in the early stages of the disease—that is to say, in the presuppurative stage. I have long been a believer in the value of cold applications in a threatened purulent mastoiditis, and I have warded off many an operation by the continued application for hours of the ice-bag. Alexander[2] has been experimenting with the apparatus of Allemann, which the latter described about two years ago in the *Wiener klinischer Wochenschrift*, 1902, No. 21. It consists of a system of tubes which are somewhat larger than those in the Leiter coil. The patient should, of course, be in bed, and the applications should last from one to seven hours. The temperature of the water should range from 44° to 46.5° C. He reports eighteen instances of acute mastoiditis which were treated after this method. In all the cases there was suppuration of the middle ear, pain on pressure over the mastoid, and retroauricular swelling. In eight cases the symptoms entirely disappeared. In seven cases the pain was subdued, but operative interference was found necessary. Three of the cases could not endure the application. The observations show us that where surgical intervention is necessary in cases where there is suppuration heat is well borne, though it does not pretend to accomplish recovery. In the first group of eight cases where the symptoms were entirely dissipated Alexander thinks there was undoubtedly pus in the mastoid cells; at the same time one cannot affirm positively that there had been resorption of a commencing suppuration. Allemann, in the case of domestic animals, has obtained complete disappearance of purulent masses in the first stage of their development. The question is whether the same effect could be gotten in the case of man. Keiper[1] has submitted this question of heat or cold to a large number of otologists, and there is a slight majority in favor of heat. I miss, however, in his statistics the names of some whose experience it would be well worth knowing.

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[1] Interstate Medical Journal, October 19, 1904.

[2] Monatsschrift für Ohrenheilk., 1903, No. 9

Apropos of this very question I might refer to a very excellent paper by Snow[2] on the value of ice in the early stages of mastoiditis. I am not sure that, as he states, more than 50 per cent. of our external operations can be avoided, but I am convinced that operations upon the mastoid are much too frequent. Snow lays much stress upon a point to which I have often referred in these pages, namely, the importance of a free incision; in other words, the establishment of free drainage, for without this antiphlogistic measures, whether they be heat or cold, will probably prove fruitless. Personally I am in favor of cold as opposed to heat, and I think the best way to apply the cold is in the Sprague ice-bag, which is a valuable addition to our armamentarium. Snow advises the uninterrupted use of the ice-bag. There should be no marked intervals in the renewing, as often happens in our hospitals, where the nurse takes the bag away to refill it, but is interrupted by a call from another patient to which she attends. He often keeps the parts under this constant low temperature until the discharge ceases. He reports no relapse except in a case of tertiary syphilitic trouble. In several severe cases he effected a cure in six days. Personally I must say I have never used the ice application for more than forty-eight hours, for I have usually felt that all the good that could be done by such an application would be accomplished in this length of time, and, furthermore, I have been somewhat afraid that symptoms of serious trouble might be masked by a long-continued application of the ice-bag. In this connection Richards reports a case where free incision of the drum membrane was followed by application of ice. The trouble as a result of this treatment apparently subsided for a few hours, when an operation was found necessary and the bone was found broken down. The superficial cells were involved, and the antrum had drained out. The ice had masked the infection in the superficial cells and in spite of every effort the patient died.

Neuralgic or Condensing Mastoiditis. In this form of mastoiditis we have the following important features. We find violent and persistent neuralgia of the affected side generally involving the frontotemporooccipital region. There is an absence of the external signs of mastoiditis, with the exception of the mastoid pain on pressure. The absence of any relation between the intensity of the pain and the condition of the ear is very striking. In discussing several cases of this character, Augièras[1] alludes to the fact that ever since the crisis of the neuralgia had necessitated surgical interference the otorrhœa had ceased and the drum cavity had completely healed. A noteworthy fact to which this observer calls our attention was the resistance of the neuralgia to all the usual remedies employed for earache, and, furthermore, the great hyperæsthesia of the ear as evidenced by exacerbations of pain after instillations of analgesic solutions, no matter how little irritating. We have also considerable general depression showing itself in insomnia, loss of appetite, etc. He is also struck by the rapidity with which all symptoms disappear after an opening is made into the mastoid. I have mentioned this as having been the experience of several other observers. An inspection of the bone after it has been opened shows that we are dealing with a condensing osteitis, in its different stages, without any trace of suppuration. The neuralgic pains are explained by the compression of the nerve elements in the condensed osseous tissue. It seems to be a condition which *per se* demands the so-called mastoid operation irrespective of the actual condition of the ear, and this operation, according to Augièras, ought to take in the greater part of the external wall of the mastoid, and he advises the removal as far as possible of all the condensing osseous tissue.

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[1] The Laryngoscope, December, 1903

[2] Journal of the American Medical Association, January 2, 1904.

INTERNAL EAR.

Labyrinth. We are not infrequently presented with cases which present puzzling symptoms, and when it is of considerable importance to get a proper idea of the trouble. I know of no aural affection where we are more apt to be led astray than in involvement of the labyrinth. We must distinguish between the two symptoms of a labyrinthian affection according to the point involved and symptoms which are excited in other organs which are in more or less close communication, as, for instance, irritation of the brain cavity. The character of the temperature has a very important bearing in this class of cases. The sudden appearance of labyrinthian suppuration can be indicated by collapse with subnormal temperature. Fever in these cases is probably due to a retention of pus. It should be remembered that all the functions of the labyrinth are not affected at the same time. The trouble in gait usually precedes the disturbance in hearing. If the pus has made its way into the vestibule the hearing can persist a long time, but when the vestibule has been opened, as, for instance, in the course of an operation, according to Brieger,[1] deafness invariably follows, and the same author calls attention to the fact that with the Weber test at the beginning of the suppuration the sound is heard best on the side of the healthy ear. Disturbances in equilibrium may be absolutely wanting not only when the cochlea is involved, but even when the suppuration has extended to the semicircular canals. Generally speaking, the vertigo is accompanied with nystagmus, and both these symptoms may disappear as a result of lumbar puncture. Brieger gives the following hints as to the treatment of this class of cases—hints which I think are of value. Of course, operative treatment is practically all that can be done or ought to be done; but sometimes these cases get well spontaneously, by the formation of either granulation or osseous tissue. The operation should be undertaken if in the course of an otitis media suppurativa there appear either symptoms of collapse or increased temperature, disturbances in equilibrium, with nystagmus and rapidly increasing deafness. I need not give the technique of the operation, as it is sufficiently well known, though not a very frequent measure.

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[1] Annales des maladies de l'oreille, etc., June, 1904.

When we come to the surgery of the internal ear, I must confess that I have found nothing in the literature of the past year to change my opinion, namely, that this branch of surgery is still in its infancy. Botey[2] has recently met with some experience in this field, and I think his cases worthy of comment. All of the cases which he reports were characterized by pretty much the same symptoms, that is to say, the symptoms which we usually meet in chronic suppuration of the middle ear, in addition to labyrinthian symptoms. All of them were operated upon. A study of these cases would lead one to conclude that where there is pus in the labyrinth subjective noises do not constitute a very constant symptom, although it must be regarded when present as a very early symptom, and certainly an ephemeral one, and this is probably due to the fact that the organ of Corti and the peripheral neurones are more apt to be destroyed than the neuroepithelial terminations of the auditory nerve in the vestibule and semicircular canals. Taking into account the small volume of the membranous labyrinth, its involvement ought to be almost total, and by the rapid diffusion of pus throughout the cochlea the deafness should be total. This is based upon a study of Botey's three cases, though it is contrary to the views held by Jansen and Hinsberg. Careful study not only of the ear, but also of the course of the disease and of the appearance of the disturbances in equilibrium which are so characteristic, does not indicate beforehand with any certainty the existence of pus in the labyrinth, nor during the act of operation can we either affirm or can we deny that we are dealing with pus in the labyrinth. The channels or orifices of communication of the middle ear with the external ear in cases of suppuration of these regions are nearly always very small, and they can easily escape observation. He advises opening of the entire labyrinth and extensive removal of the parts, even in cases where the pus is confined to the interior of the external semicircular canal. In this way we not only get good drainage, but the pus cannot spread into the interior of the nooks of the labyrinth. In cases where there is some doubt, particularly where there is some perception of sounds in the affected ear, Botey advises atticoantrotomy, and then he waits for four or five days. If after this lapse of time the labyrinthian trouble persists with the same intensity, one is justified in opening the labyrinth, which is apt to be found infected. Botey lays no stress on the nystagmus which occurs quite often from accidental injuries of the horizontal semicircular canal. He does not regard extensive opening of the labyrinth as a dangerous procedure, putting the mortality below 4 per cent. A labyrinthian fistula which is unaccompanied with vertigo, or other subjective symptoms, such, for example, as tinnitus and deafness, does not warrant extensive opening, and on this point he agrees with Jansen and Hinsberg. In these cases it is simply necessary to enlarge very carefully the opening of the fistulous track, without troubling the membranous labyrinth, and in removing whatever granulation tissue we find, and in searching diligently for any possible focus of pus. At the end of three or four months, when the whole operative cavity is well covered with skin, if there be still a discharge of pus from the channel of communication between the middle and internal ear, and there is also vertigo, it is best to make an extensive opening; but if there exists no fistulous track after epidermitization of the operative cavity, we will be warranted in considering the cure complete. Botey goes on to show that pus can be present in the labyrinth without disturbances in equilibrium, and in such cases operation alone will demonstrate its presence. It is most certain that the labyrinth has been destroyed and that we will have complete deafness. Even where labyrinthian symptoms are present and the Stein test shows disturbance in locomotion, it does not necessarily mean that the labyrinth is destroyed. Botey's contribution is a very interesting one, and his suggestions as to treatment are practical and valuable.

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[1] Annales des maladies de l'oreille, etc., August, 1904.

[2] Ibid., December, 1903.

MISCELLANEOUS.

Lesions of the Organ of Hearing Due to the Detonations of Firearms. This interesting subject has been specially studied by Professor Ostino[1] and with especial reference to rupture of the tympanic membrane. According to most writers it is supposed that the rupture is produced by the sudden increase of atmospheric pressure. Ostino thinks that this factor is insufficient, as is shown by the experiments of his assistant, who established the fact by means of a manometer that the pressure of air produced by a cannon at the height of the cannoneer's ear is exceedingly slight, and he thinks there is another factor, the so-called sonorous vibration. The vibrations which accompany an explosion are reflected in part on the membrane and in part are transmitted to the labyrinth. We must remember that when cannons are fired not only do houses and even the earth tremble, but glass is shattered—a fact which proves that vibrations can cause rupture of the drum membrane. He discusses the question of predisposing causes, among which he places the peculiar vulnerability of the labyrinth caused by syphilis, the weakness of the tympanic membrane caused by old suppurative processes which have been cured, tubal stenosis, etc. Ostino agrees with Nimier in thinking that perforations of the tympanic membrane do not constitute a predisposing cause. Of course, either the functional or objective disturbances depend more or less upon whether the ear was originally a healthy or a diseased one. For example, if we have an ear which is affected with syphilis or one in which there is tubal obstruction, we will get as a result of a detonation the symptoms of labyrinthian trouble. This variety of disturbance, according to Ostino, is found most frequently among old artillerymen. Examination of the membrane immediately after the accident shows a more or less diffuse redness of and sometimes a little hemorrhage in the membrane. In cases where the ear has been the seat of syphilis the prognosis is very bad, and somewhat less bad in cases where we have a chronic aural catarrh. Naturally, the treatment would consist in keeping individuals who have had any sort of ear disease away from artillery practice. He refers to the usual methods of nullifying the effects of sound by putting tampons in the ears, and he regards them as more or less unsatisfactory, as they prevent the commands from being heard. Ferrand has constructed a little apparatus which is attached to the auricle, and which has some advantages over the measures usually employed. In cases in which perforation has occurred it seems to me that we should treat the condition just as we would had the perforation resulted from an ordinary acute inflammation of the middle ear, and the same may be said of the graver cases, such, for instance, as in the event of the complications mentioned above.

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[1] Giorn. med del. R. esercito, 52 année, May, 1904.

Symptoms of Leptomeningitis of Aural Origin. We all know the great difficulty often met with in interpreting some of the symptoms originating in a middle-ear suppuration. How often we get symptoms which point strongly to a cerebral inflammation and operation reveals nothing abnormal! Gradenigo[1] has observed a special train of symptoms in some of these serious cases, and when they are present we may decide upon the presence of a circumscribed leptomeningitis. The symptoms are as follows: very intense pain not only in the ear, but also on that side of the head, with the pain localizing itself preferably in the temporoparietal region. After a period of time, varying from twenty days to two months, that is to say, from the commencement of the otitis, there appears a paralysis or paresis of the oculomotor on the affected side without other ocular symptoms.

Tobacco and Hearing. I do not know that any literature exists to show that tobacco has any specific influence upon the organ of hearing. We all know that pharyngeal troubles may be aggravated by constant smoking, and in this way middle-ear catarrh may be made worse, but I think it is generally conceded that tobacco does not work upon the auditory apparatus, as it does, for example, upon the visual. In this connection Delie[2] has made some interesting observations, reporting in all ten cases. The principal symptom is deafness coming on and becoming worse in a lapse of time relatively short, associated with all sorts of subjective noises, vertiginous phenomena, etc. The latter symptoms are not constantly observed, and are usually late manifestations, and are not so distressing as when seen in other aural affections. The objective examination throws no light upon the diagnosis. The results were particularly disastrous in young people affected with sclerosis of the middle ear. The nicotine seems to exert its influence directly upon the acoustic nerve, and brings about circulatory disturbances, as a result of exciting the sympathetic. At the same time it engenders and accelerates the development of a trophoneurosis. He advises moderation in the use of tobacco, and he considers it especially harmful in individuals who are affected with ear trouble, and also in persons who are predisposed to sclerotic changes in the ear through heredity.

Accidents to the Ear in Travelling, and their Significance. It is clear that the importance of this subject has not been so clearly recognized as it ought to have been, though laws bearing upon this point do exist. Accidents of this character are met with in travelling on railroads, in carriages, automobiles, and in explosions in mines, etc.

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[1] Rev. heb. de laryngologie, d'otologie, etc., September, 1904.

[2] Ibid., August 27, 1904.

Often the lesion passes unnoticed, because there is no external evidence of such a lesion, and because the symptoms of cerebral concussion mask all other symptoms, and the consequence is that a medicolegal examination is tardy. The trouble manifests itself by deafness or even by morbid acuteness of hearing, diminution in vocal sonorousness, subjective noises, and vertigo, accompanied with other manifestations of traumatic neurasthenia. One of the ears is ordinarily more affected than the other, and the internal ear is principally involved. The diagnosis is, according to Castex,[1] very puzzling when there is a history of previous ear trouble. Simulation is possible, but rare, and, as is well known, there is a strong tendency in this class of patients to exaggerate. Castex is of the opinion that the prognosis is grave, for while the vertigo and subjective noises often disappear, deafness persists, and repeated examinations at long intervals should be made of these individuals. After all, the surest way of ameliorating the condition of this class of persons is to give them satisfactory damages, as the usual methods of treatment for the same lesions from other causes is usually futile. In making a medicolegal report upon such a case he advises that the exact nature and degree of incapacity should be touched upon, and mention should be made whether the condition is partial or temporary or permanent.

Lumbar Puncture. I have alluded in previous reports to the value of lumbar puncture in certain ear affections, particularly labyrinthian. Babinski[2] has made several communications on this subject, and he may be regarded as the chief representative of this therapeutic measure. More recently he reports 106 cases, in which 32 were affected with vertigo. Among these 32 the result of the treatment in 11 cases was negative. As regards the other 21, 7 were cured, or at least they were relieved of their vertigo; 3 of these were genuine labyrinthian troubles; 2 were old cases of suppurative otitis media, which had healed up, leaving behind a more or less cicatricial drum membrane, and the remaining 2 were cases of middle-ear sclerosis. Unfortunately the author does not give any data as to the result of the functional examination, either before or after the lumbar puncture. In 4 other cases (2 of which were labyrinthian and the other 2 sclerosis of the middle ear) there had been no vertigo three months after the lumbar puncture. Seven cases had been lost sight of a few days after the operation; 3 patients reported that they had been temporarily helped. Among 90 individuals who were suffering with subjective noises, 30 were improved or cured. In 100 cases where deafness was found, 13 heard better after the lumbar puncture. It is clear that this procedure has a pretty definite effect for good; at least, the tendency is to improve the patient's condition. This effect is markedly seen in aural troubles of which vertigo is a prominent symptom. The operation seems less effective in cases characterized especially by tinnitus and deafness, and, generally speaking, the best results were seen in labyrinthian troubles.

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[1] Rev. heb. de laryngologie, etc., August 24, 1904.

[2] Annales des maladies de l'oreille, etc., February, 1904, No. 2.

Chevasse and Mahu[1] have also made an exhaustive study of the effects of lumbar puncture on the endocranial complications of suppuration of the middle ear, and I am much inclined to think that it can be regarded as at least a very valuable means of diagnosis, and when made without aspiration, without general anæsthesia, and in the recumbent position it seems to be a harmless procedure. It is, of course, necessary in making a clinical study of this character to take into account the positive as well as the negative results, and we ought not to lose sight of the fact that in certain general diseases there is a marked change in the character of the cerebrospinal fluid. In the great majority of cases a thick or even clear liquid containing, after centrifuge, either bacteria, polynuclear leukocytes, or these two elements combined, indicates the existence of an infectious meningitis. In extradural and subdural suppuration the cerebrospinal fluid preserves its normal composition as long as the arachnoid sac is not subjected to irritation. In cerebral abscess, in thrombophlebitis of the lateral sinus, and in serous meningitis, the liquid is clear and normal. After traumatic lesions of the labyrinth or of the base of the skull, with aural symptoms, one will often find red globules in the cerebrospinal fluid. It is evident, however, from a study of these observations that the therapeutic value of lumbar puncture is uncertain, but in view of the results reported it is advisable to combine it at least with surgical intervention in cases of meningitis, certainly as long as the situation does not appear, clinically speaking, desperate.

The measure will at least demonstrate the curability of certain forms of meningitis. Among otologists in America lumbar puncture has not yet found any footing to speak of, though a study of foreign literature would lead me to conclude that much useful information, if not actual therapeutic benefit, might be obtained from recourse to this procedure. Apropos of its use as a therapeutic measure, I might refer to the communication of Trétrôp[2] at the last meeting of the Belgian Otological Society. He reports his own results. The quantity of spinal fluid which was removed varied from 6 c.c. to 17 c.c. (f℥iss to f℥v). The pain amounted to nothing, and the functional results have certainly been encouraging so far as the subjective noises and vertigo were concerned. As regards the deafness, he obtained results in three cases which, to say the least, were startling. A young girl, aged sixteen years, completely deaf and subject to headaches, nausea and vertigo, actually heard the watch at 40 cm. In the second case the woman had been deaf for fifteen years, and was also a sufferer from vertigo and subjective noises, and she also was much improved. The third case was even more remarkable. The patient was totally deaf in one ear, and as a result of the puncture she heard the voice out of the ear which was thought to be lost, and her hearing in the other ear was much improved. It would seem from all this that the so-called Babinski method has already accomplished a great deal in ameliorating a most troublesome train of aural symptoms.

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[1] Annales des maladies de l'oreille, etc., 1903, No. 11.

Rev. heb. de laryng., etc., July 23, 1904.

Persistent Perforation of the Tympanic Membrane and Whether this Condition Unfits an Individual for Military Service. Toubert,[1] a military surgeon, discusses this important question. According to this observer persistent perforations of the drum membrane ought only to be taken into account in this connection when they are associated with a chronic affection of the tympanic cavity. Every case should always be thoroughly studied, and the examination should always be made by an otologist. While individuals so affected are in service they should be carefully watched, and it would be well not to allow them to go in swimming, as it is well known that such conditions are often made worse by this form of bathing. In Germany the conditions of inaptitude for military service as regards the ear are still in need of revision. In France, however, a perforation of the drum membrane without otorrhœa is quite compatible with military service, while chronic affections of the middle ear with or without persistent discharge, with or without perforation of the membrane, are sufficient reasons for exemption from service.

Otitic Brain Abscess. I have frequently touched upon this subject in these reports, and have more than once called attention to the great difficulty of the diagnosis. I have cited instances where distinguished neurologists pronounced a given condition one of brain abscess where the symptoms could hardly be interpreted as meaning anything else, but where no abscess was found and the patient recovered. We all know that the drowsiness, absence of fever, slow pulse, and vomiting which are seen in brain abscess can also occur in serous and tuberculous meningitis, and also in brain tumors. Hence a positive diagnosis is practically impossible. Uchermann[2] advises in this class of cases resection of the mastoid, so that the condition of the bone and adjacent dura can be determined. In this way we can determine the presence or not of sinus thrombosis, epidural abscess, and caries of bone adjacent to the dura. When the dura is exposed it usually bulges, but does not pulsate. In the beginning of brain abscess, or even when we are dealing with a small abscess, the symptoms are well defined or maybe they are wanting entirely, thus making a diagnosis impossible, unless the cavity is found accidentally during the operation. In children the symptoms, as can be easily imagined, are very obscure. Fever and vomiting may be present, but these cannot be regarded as characteristic, unless accompanied by other more suggestive symptoms. Toward the last the diagnosis can usually be made, though, as the author says, it is then too late to be of any value. In addition to the inflammatory symptoms of this stage coma comes on suddenly with a rapid rise of temperature, and is soon followed by death. Aphasia with or without associated disturbance of the opposite side points to the probable location of the trouble in the left temporal lobe, while crossed paralysis of the extremities would indicate involvement of the motor areas in the temporal lobe. Local symptoms are so infrequent when the abscess is situated in the cerebellum that in cases of primary disease in the posterior part of the mastoid or in the labyrinth, with symptoms of abscess, the absence of focal symptoms is considered by some to be strong evidence that the seat of the abscess is in the cerebellum. At the same time he cites two cases, one a man aged twenty-six years, and the other a boy aged sixteen years, where there were large abscesses of the temporal lobe, and yet focal symptoms were absent. As to whether we are dealing with brain abscess especially of the cerebellum or with a serous meningitis, Uchermann confesses to the great difficulty of deciding. A history of otorrhœa favors the view that we are dealing with an abscess, but a differential diagnosis is often impossible without exploratory puncture. It is equally difficult to differentiate between brain tumor and tuberculous meningitis with coexisting suppuration of the middle ear. The latter may run its course with elevation of temperature and slow pulse, and in such cases we can only make a diagnosis by resection of the mastoid. If the bone is found to be generally healthy, except possibly in the region of the antrum or the attic, the presence of brain abscess is not very probable. The nature of the meningeal exudate can only be determined by exploratory puncture and microscopic examination. If we are dealing with serous meningitis the puncture is nearly always followed by improvement, but this is not the case when we have a tuberculous inflammation. In cases of middle-ear suppuration, where we are in doubt whether we have brain abscess or tumor, a great deal of importance should be attached to the duration of the development. In tumors of the brain the symptoms develop much more slowly than in abscess, and are generally associated with more marked optic neuritis, which can even amount to a choked disk.

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[1] Der Militararzt, Nos. 1 and 2, 1904

[2] Archives of Otology, October, 1904.

Blindness, too, is more frequent, while progressive involvement of the cranial nerves is often seen.

The Diffusion within the Brain of Tuberculosis of Aural Origin. Ever since Schwartze made his observations on this subject we have been hearing how easy it is for tuberculosis of the ear to spread itself to the brain. The truth of this statement can only be demonstrated by establishing the coexistence of tuberculous lesions in the contiguous cerebral region without the existence of tuberculous foci elsewhere in the body, and this demonstration would be still more precise if we could indicate with exactness the route followed by the organisms in going from the ear into the brain. The carotid, the temporal bone (showing itself as an ostitis), and the petrosquamous fissure have all been pointed out as possible routes, but it should be remembered that very frequently in autopsies on infants tuberculous foci have been found and foci of the same character in the brain without it being possible to trace the connection. It is probable, however, that the infection was conveyed through the general circulation. The dura ought certainly to be the principal obstacle to the passage of tuberculous material into the brain. Hegetschweiler, in autopsies where tuberculosis of the ear was present, found in sixteen cases involvement of the dura. In one case only was there any perforation of the dura and resulting encephalitis. Not only the dura but the venous sinuses can be affected. Upon the basis of histological examinations of preparations from infants which had died of tuberculosis, Poli[1] is of the opinion that that portion or layer of the dura next to the bone is really the main defence against tuberculous infection, and that the venous sinuses participate in the fortunes of this layer. This non-participation on the part of the internal layer of the dura can only be explained by the fact that it is almost entirely devoid of bloodvessels, and also by the fact that the tuberculous process itself is also rather feeble. It is probable that when a perforation of the dura occurs on contact with a tuberculous point in the bone, it is really caused by a, so to speak, superadded infection more active and, of course, more intense than that which is due to Koch's tubercle bacillus. We may conclude, then, that while tuberculous infection of the brain originating in the ear is possible, it is certainly not frequent.

Changes in the Ear Resulting from the Administration of Salicylate of Soda. I have now and again alluded to the danger of giving quinine in middle-ear inflammation, and many of us no doubt have experienced the uncomfortable aural symptoms which often follow the administration of salicylate of soda. It might be well to bear in mind the fact that either one of these agents produces distinct anatomical changes in the auditory apparatus, and when the latter is diseased it behooves us to administer quinine and salicylate of soda with great caution. Cases are not wanting to show serious if not permanent impairment of hearing from the administration of either of these drugs in the course of an acute suppuration of the middle ear, and the recent experimental contribution of Blau to this question has real practical value. His experiments were made on guinea-pigs and mice. The changes seem to involve the protoplasm of the cell, and particularly the little bodies which have been described by Nissl as located in the protoplasm. These bodies are frequently absent or at least have undergone degeneration. The cells and even their contours lose their distinctness; in fact, we may have complete disappearance of the cells. It would seem that the changes are localized chiefly in the ganglion cells when the animals are subjected to the influence of the drug for any considerable time, and generally we find the changes to be of no slight degree; at the same time the cells do not seem to be equally involved. In the acute cases we have very much the same changes in the ganglion cells, though perhaps somewhat slighter in degree. To sum up, then, these experiments show that the disturbances in hearing caused by salicylate of soda are due to injury of the ganglion cells in the ganglion spirale and vestibular ganglion. I might refer in this connection to the observations of Dreyfuss,[1] who found that quinine paralyzed the functions of the acoustic nerve in both its branches, and he attributes the effect of quinine medication in diseases of the ear to its paralyzing action on the labyrinthian tone—that is to say, we get a loss of sensibility of the vestibular branch of the acoustic.

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[1] Bollett. della R. academia med. de Genova, anno. xviii., No. 3.

Schwabach[2] has recently reported a case where the patient, a young woman aged twenty-eight years, had been taking large doses of a preparation of salicylic acid, and who had become profoundly deaf. She subsequently recovered her hearing after leaving off the medicine.

Gunshot Injuries of the Ear. One of the most interesting contributions of late comes from the pen of Orgebin,[3] and the author discusses in an exhaustive way the injuries of the ear caused by pistol bullets. In none of the cases which he reports did the bullet penetrate the meninges. He discusses in an interesting manner the complications, diagnosis, prognosis, and, finally, the operative indications and treatment generally. He does not regard such injuries as extremely rare. Generally speaking, we have pain and loss of consciousness, primary hemorrhage without lesion of the larger vessels. The most frequent complications are facial paralysis, either compression or section of the nerve; hemorrhage due to opening of the internal carotid, or of the jugular vein, or even of the sinus; labyrinthian complications, or infections which may lead to mastoiditis and cerebral trouble. As regards the diagnosis, one can readily see that we would often be in the dark as to the seat of the bullet, and radiography is, of course, our most reliable guide if the missile cannot be reached easily by a probe. It is interesting to note that in the literature of this subject one will find that there are a certain number of surgeons who believe in abstaining from operative treatment in this class of cases, holding that the traumatism necessary to get at the bullet is often more serious in its effects on hearing than the wound made by the bullet, and that it would be much better to trust to encysting of the bullet. In a case where the ball is visible or at least where it can be touched by a probe, it should be removed. Again, where the ball is invisible and yet giving rise to serious symptoms, such, for instance, as facial paralysis, hemorrhage, and labyrinthian troubles, it seems advisable to remove the ball, but when it is giving rise to no trouble one might as well refrain from any operative interference. These are the fresh cases. There are cases, however, which come to us with a history of bullet wound received months previously, and here we ought to interfere only when the bullet is visible or is giving rise to serious symptoms, such as vertigo, suppuration, or facial paralysis. Where the bullet is in the external auditory canal, or even in the tympanic cavity, we may often get it with ease through the canal, but sometimes it will be necessary to make the retro-auricular incision, and to go into the tympanic cavity from the rear. When the ball is deeply embedded in the mastoid process or the temporal bone, one must proceed in a very cautious manner, as very serious complications may arise from an entrance into the deeper parts. As I have said, little or nothing on this subject has been contributed to otological literature, and this is rather surprising when we consider that bullet wounds of the aural region are not rare occurrences even in ordinary every-day life, to say nothing of the casualties of war. Orgebin's communication, then, is one of the few along these lines, and for this reason added to the thoroughly practical character of the work it may be regarded as of distinct value.

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[1] Annales des maladies de l'oreille, etc., de larynx, etc., October, 1904.

[2] Deutsch. med. Wochenschrift, No. 2, 1904.

[3] Rev. heb. de laryngol., etc., March 19, 1904.

Local Anæsthesia. I have touched upon the subject of local anæsthesia a number of times in PROGRESSIVE MEDICINE. We know that the ordinary solution of cocaine—that is to say, of the strength used for eye operations—is not suitable for operations upon the ear. Gray's solution of cocaine, aniline oil, and alcohol, has done me good service, and I have generally succeeded in opening the drum membrane painlessly since I have employed this solution. Cornet[1] employs with success a solution of chlorhydrate of cocaine in alcohol. I have frequently used solutions of cocaine (10 per cent.) in alcohol, but a fresh solution of the Gray mixture gives, in my opinion, better results. In operations upon the drum membrane it is well to employ a solution of 1 to 10, and the anæsthesia should be kept up for ten minutes at least. After operating with this solution one rarely sees superficial scars of the tympanic membrane. In operating in the drum cavity it is well to clean out thoroughly the pus before instilling the cocaine solution. When the perforation is large and the solution can readily reach the cavity, it is not necessary for the cocaine solution to be stronger than 1:30, but where we intend to perform curettage a 1:10 solution should be employed.

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[1] Rev. heb. de laryngol., etc., September 10, 1904.

Importance of an Examination of the Ears of Children in Acute Diseases. McKernon[1] thinks it highly important that the ears of children who are suffering with acute diseases should be examined, so that the presence of any pathological change may be early recognized and treated. In very young children otoscopic examination is very difficult for those not constantly practising it. The speculum, as I have always strongly urged, should be small, and the auricle should be drawn backward and downward, and in this way we can open the canal and expose the deeper structures. He calls attention to the fact that inspection of the drum membrane (when middle-ear disease is suspected) will reveal no trace of congestion owing to the exfoliated epithelium on its surface, but if the latter is gently brushed with a cotton-tipped probe the white-looking drum will be replaced by a reddened, bulging, and angry-looking surface. Aural complications should be looked for each day, and in a large number of cases which came under his observation there was no symptom of aural trouble until after the damage was done—that is to say, after spontaneous rupture—an event which might always be avoided by constant otoscopy. He suggests that ear complications should always be looked for in acute gastrointestinal affections, pneumonia, grippe, and typhoid fever.

And these observations of McKernon's suggest to us all the importance of an otologist's knowing his general medicine. Cobb[2] makes some sensible remarks in connection with this point. In dealing with these local conditions we shall be doing our patients a great service when we refer them to their family physicians for any disturbance in the general health which may be present at the time they are under our care, and not attempt to treat a systemic condition which the family physician, from long experience with the individual's peculiarities, can handle so much more successfully than we can ever expect to do.

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[1] Medical Record, June 25, 1904.

[2] Journal American Medical Association, December 19, 1904.

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PROGRESSIVE MEDICINE.

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES.

EDITED BY

HOBART AMORY HARE, M.D.,

PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA; PHYSICIAN TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL; ONE TIME CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA; MEMBER OF THE ASSOCIATION OF AMERICAN PHYSICIANS, ETC.

ASSISTED BY

H. R. M. LANDIS, M.D.,

VISITING PHYSICIAN TO THE TUBERCULOSIS DEPARTMENT OF THE PHILADELPHIA HOSPITAL, TO THE WHITE HAVEN SANATORIUM AND TO THE PHIPPS INSTITUTE; DEMONSTRATOR OF CLINICAL MEDICINE IN THE JEFFERSON MEDICAL COLLEGE.

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LIST OF CONTRIBUTORS.

WILLIAM T. BELFIELD, M.D.,

Associate Professor of Surgery in the Rush Medical College; Professor of Genitourinary and Venereal Diseases in the Chicago Polyclinic, Chicago.

JOSEPH C. BLOODGOOD, M.D.,

Associate in Surgery, Johns Hopkins University, Baltimore, Md.

JOHN ROSE BRADFORD, M.D., F.R.C.P., F.R.S.,

Professor of Medicine and Physician to the University College Hospital, London.

JOHN G. CLARK, M.D.,

Professor of Gynecology in the University of Pennsylvania, Philadelphia.

WILLIAM B. COLEY, M.D.,

Attending Surgeon to the General Memorial Hospital; Associate Surgeon to the Hospital for Ruptured and Crippled; Clinical Lecturer in Surgery and Instructor in Surgery at the College of Physicians and Surgeons, Columbia University, New York.

FLOYD M. CRANDALL, M.D.,

Adjunct Professor of Pediatrics, New York Polyclinic Hospital; Visiting Physician to the Minturn Hospital for Scarlet Fever and Diphtheria; Consulting Physician to the Infants' and Children's Hospitals, New York.

WILLIAM EWART, M.D., F.R.C.P.,

Physician to and Joint Lecturer on Medicine at St. George's Hospital, and Physician to the Belgrave Hospital for Children, London.

EDWARD MILTON FOOTE, M.D.,

Instructor in Surgery, Columbia University; Visiting Surgeon, New York City Hospital.

CHARLES H. FRAZIER, M.D.,

Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, Howard, and Philadelphia Hospitals.

WILLIAM S. GOTTHEIL, M.D.,

Professor of Dermatology and Syphilology, New York School of Clinical Medicine; Consulting Dermatologist to the Sheltering Guardian Orphan Asylum; Dermatologist to the Lebanon and Beth Israel Hospital, and to the German West Side Dispensary, New York.

CHARLES PREVOST GRAYSON, A.M., M.D.,

Lecturer on Laryngology and Rhinology in the Medical Department of the University of Pennsylvania; Physician-in-Charge of the Department for Diseases of the Throat and Nose in the Hospital of the University of Pennsylvania ; Laryngologist and Otologist to the Philadelphia Hospital.

EDWARD JACKSON, M.D.,

Emeritus Professor of Ophthalmology in the Philadelphia Polyclinic.

H. R. M. LANDIS, M.D.,

Visiting Physician to the Tuberculosis Department of the Philadelphia Hospital, to the White Haven Sanatorium and to the Phipps Institute ; Demonstrator of Clinical Medicine in the Jefferson Medical College.

RICHARD C. NORRIS, M.D.,

Assistant Professor of Obstetrics in the Medical Department of the University of Pennsylvania, Philadelphia; Physician-in-Charge of Preston Retreat.

ROBERT B. PREBLE, A.B., M.D.,

Professor of Medicine in Northwestern University Medical School; Attending Physician to Cook County, St. Luke's, Wesley, German, and Polyclinic Hospitals, etc., Chicago.

ROBERT L. RANDOLPH, M.D.,

Associate Professor of Ophthalmology and Otology in Johns Hopkins University, and Associate Ophthalmic and Aural Surgeon to Johns Hopkins Hospital, Baltimore, Md.

WILLIAM G. SPILLER, M.D.,

Professor of Neuropathology and Associate Professor of Neurology in the University of Pennsylvania ; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania and in the Philadelphia Polyclinic.

J. DUTTON STEELE, M.D.,

Associate in Medicine, University of Pennsylvania.

ALFRED STENGEL, M.D.,

Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia.

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PROGRESSIVE MEDICINE.

JUNE, 1905.

HERNIA.

By WILLIAM B. COLEY, M.D.

The Treatment of Hernia Associated with Undescended Testis is beginning to receive more and more attention. The most important contribution to this subject is that of Odiorne and Simmons,[1] of Boston, being a study of 77 cases.

Of the 77 cases reported 15 were double, 39 of the right side, and 23 of the left. There were 17 examples of abdominal retention, 51 of inguinal, 18 of pubic, 5 puboscrotal, 1 subcutaneous above the external ring, or inguinosuperficial. In all cases there was a certain amount of atrophy present.

According to Marshall's statistics the frequency of undescended testis is about 1 in 900, which estimate is based upon examination of 10,000 recruits.

The frequent complication of hernia with undescended testis is shown by Odiorne and Simmons' cases in 57 per cent. of which a hernia was present.

Of 49,859 cases of hernia observed at the Hospital for Ruptured and Crippled between 1891–1902, 400 were associated with undescended testis.

Of 48,000 cases of hernia in the male, observed by Eccles, 854 were associated with undescended testis.

The question of the liability of undescended testes becoming the seat of malignant disease is discussed. A number of the older authors are quoted in proof of the belief that the undescended testis is a source of great danger by reason of this tendency to become the seat of a sarcoma. Fischer, in 1904, was able to collect 39 such cases.

In a series of 54 cases of malignant disease of the testis observed at the Massachusetts General Hospital during a period of twenty-six years, there were 6 cases with sarcoma starting in an undescended testis, or 11 per cent. Odiorne and Simmons state that Schaedel, quoted by von Kahlden, reported that in a large London Hospital, in one year, 41 cases of malignant disease were seen, 5 of which were in undescended testicles, or 12 per cent.

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[1] Annals of Surgery, December, 1904.

I believe that there must be an error regarding the last statement, inasmuch as it is quite unreasonable to suppose that 41 cases of such a rare condition as malignant disease of the testicle should have been observed in a single hospital in a single year, especially as only 54 cases were observed in twenty-six years in such a large hospital as the Massachusetts General, and one drawing material from the greater portion of New England.

On the other hand, Eccles who has probably made a more careful study of the undescended testis than any other writer, believes that we have not sufficient proof to assert that sarcoma occurs more frequently in undescended than in the descended testis.

My own experience within the last fifteen years at the Hospital for Ruptured and Crippled confirms the opinion of Eccles, inasmuch as in nearly 60,000 cases of hernia not a single case of sarcoma due to undescended testis has been observed. Of 26 cases of sarcoma of the testis personally observed, the first 24 occurred in men with fully descended testes. Strange to say, in the twenty-fifth and twenty-sixth case the disease had its origin in an undescended testis, one of inguinal, the other of abdominal retention.

As regards the treatment of hernia associated with undescended testis, Odiorne and Simmons believe that no child with double undescended testis should be allowed to reach the age of puberty without an effort having been made to bring the organs into their normal position, the reason being that, if this is not done, the individual will probably remain sterile for life. Unlike Corner, McAdam Eccles, and others, Odiorne and Simmons believe that the influence of an undescended testis upon the development of the male characteristics may be exerted whether the testis be descended or not, but that the function of spermatogenesis seems to depend upon a more or less normal position of the testis. They believe that in operations upon children both organs should not be placed in the abdominal cavity, for such testicles are invariably functionless and in no case, single or double in children, should orchidectomy be done, unless the testis is hopelessly degenerated. If in adults with double arrest an attempt at orchidopexy is unsuccessful the organs may be returned to the abdominal cavity. Removal of one testis should be done only as a last resort and castration is never justifiable. For abdominal retention no treatment is indicated. They believe that orchidopexy is the operation of choice in children.

As regards the results of this procedure, Broca has reported 138 cases; 79 were traced for one year; 31 of these were normal in size and position; 35 normal in size, but high in the scrotum; 13 were atrophied. All of Broca's cases were in young children.

In Odiorne and Simmons' cases 24 orchidopexies were done on 22 patients; 7 of these were under fourteen years of age; perfect results were obtained in but two instances. In 11 operations upon adults from sixteen to fourty-two years of age five testicles have remained in the scrotum, four of them occupying a high position in it, the other an almost perfect position. Three retracted soon after operation into the canals, one of them causing much pain. It is said that in every case in which the organ appeared normal at the time of operation, there was a subsequent diminution in size. In no case has there been a recurrence of a complicating hernia.

Personally, I have operated upon 70 cases of undescended testis, 20 of these were adults from fifteen to forty years; 48 were children under the age of fifteen years. Twelve adult cases have been observed from one to six years; 19 children from three to eight years. There has been no return of the hernia in any case. In the majority of the cases the testis has retracted to the upper portion of the scrotum or just outside of the external ring. In a number of cases the organ has remained in place, but my final statistics as regards the position of the testes are not yet completed.

The Operative Treatment of Hernia in Infants and Young Children has recently been very thoroughly discussed by H. J. Stiles,[1] of Edinburgh, who reports 360 consecutive operations, 26 per cent. of which number were in infants below the age of one year. He states that of the total number of surgical cases seen at the Royal Edinburgh Hospital for Sick Children, 7 per cent. suffered from inguinal hernia. He is exceedingly skeptical as to the value of mechanical treatment in infants, and states that by careful rolling the cord between the forefinger and thumb he has almost invariably been able to satisy himself of an empty sac in cases in which the hernia was supposed to have been cured, and in quite a number of instances the bowel had, as the result of some extra strain, or an attack of whooping-cough, actually descended into the sac.

The hernial sac in children or young infants is extremely thin and delicate—as thin as the thinnest tissue paper—so that it would seem a very difficult matter to detect the presence of such a sac; still more difficult would it be to determine whether or not a portion of it had been obliterated.

Stiles believes that it is just in those cases in which the hernia is supposed to have been cured by a truss during childhood that strangulation is likely to occur in young adult life as a result of some severe strain, and he believes that the mortality of strangulation in such cases is greater than the death rate from radical operation during infancy and childhood.

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[1] British Medical Journal, October 1, 1904, No. 2283, p. 812.

This raises a most interesting question, but I believe that it is one that it is difficult to answer with our present data. Stiles goes farther than almost any other writer upon the subject of the radical cure of hernia in recommending and urging operation in young infants. He states that he had not used a truss in the Royal Edinburgh Hospital for Sick Children for the last four or five years, and in private practice he has used a truss only when parents have refused operation which he invariably recommends, provided the child's condition of health will warrant it. His reasons for extending the limits of operation to infants and very young children are, that the operation is practically free from risk, is not followed by recurrence, and no truss is needed after operation. Furthermore, that by operation we are able to cure the rupture in a fortnight, while a truss may require one or several years with the probability of failure in the end. As regards the age of patients, he believes that the operation is practically as safe in the young infant as it is later on. If asked at what age he would prefer to operate he would say "just before teething." In a young and delicate infant with a rupture appearing a few weeks after birth, he would wait a month or two to see what happens, but in the interval would not use a truss.

This teaching I believe to be altogether too radical. I think Stiles has greatly underestimated the number of cures from mechanical treatment during infancy. De Garmo, whose experience not only with the mechanical treatment of hernia but also with its operative treatment, has been surpassed by few, believes that 90 per cent. of children under the age of three are cured by truss. While personally I would not place the estimate quite so high, I believe that more than half of the cases under three years of age are cured by truss and a much higher percentage under the age of one year. No doubt some of these supposed cures do recur later in life, but I believe it far better to operate upon these few cases when they reappear than to subject the entire number to operation during the period of early infancy. Only a few days ago I examined a child two years of age in whom a very large scrotal hernia appeared when the child was four weeks old. The hernia was reduced with great difficulty and a truss immediately applied has been worn ever since. The hernia has never been seen from the time the truss was first applied, and at present there is no impulse on coughing. The most important objection to operating upon infants under the age of one year is that it has not yet been proven that the operation in such cases is free from risk. Stiles' own cases furnish evidence to the contrary. He reports 5 deaths in his 360 operations, 3 in his first 100. I believe it much wiser to try mechanical treatment up to the age of three to four years. After that age the risk attached to the operation is less and the chances of a cure by truss treatment are also decidedly less. I personally have operated upon 840 cases of children, all over the age of four years, with the exception of 11 cases of strangulation, with only a single death, due to ether pneumonia.

Stiles reports an unusual number of interesting cases in his list, among which are 24 cases in which the cæcum was found in the sac, or 7 per cent., and in 5 out of 36 cases of inguinal hernia in girls the sac contained the ovary and Fallopian tube, a remarkably high percentage. The method of operation employed by Stiles is practically the operation introduced by Sir Mitchell Banks. It consists in brief in the isolation of the ligature at the neck of the sac at a level with the internal ring, without splitting up the aponeurosis of the external oblique as in Bassini's operation. For the closure of the canal Stiles believes that all that is necessary in the majority of cases is to introduce a single catgut suture through the outer pillar close to Poupart's ligament across the canal, superficial to the cord and then from within outward, through the conjoined tendon and the inner pillar of the ring.

This method differs very little from the old Czerny method and the results of the same in a small series of cases performed at the Hospital for Ruptured and Crippled in 1888 to 1890 show a large percentage of recurrences. I do not believe it to be equal to Bassini's method even in children. In regard to the wound treatment and after-treatment, Stiles advances some novel ideas. The treatment which he believes gives the best results in infants and young children is that in which the sutured wound apart from being smeared over with iodoform and thickly dusted with boracic acid powder, is left exposed without the application of any dressing. The infant is kept flat on its back by means of a strap passed behind the shoulders and through the armholes of a flannel band, passing across the front of the chest; the ends of the strap are carried under the frame of the bed, where they are tied. A small draw-sheet is folded into four layers and placed under the pelvis to receive the feces. The horsehair sutures of the skin are removed on the sixth or seventh day, and the infant is generally sent home on the eighth to ninth day. Stiles states that in the last 100 cases treated in this way there was only one suppuration. With this method of after-treatment he has come to regard the radical cure of hernia in infants as an operation giving less trouble than circumcision.

Personally, I believe that the method adopted at the Hospital for Ruptured and Crippled fourteen years ago, and used constantly since, of applying a plaster-of-Paris splint from the chest to the knee, is simpler and more comfortable to the patient. While our experience with young infants is not large, we have applied the same method in all the cases of strangulated hernia, the youngest being thirteen days old, and primary wound healing occurred in every case. The fear of the wounds becoming contaminated with urine in infants and young children has been very greatly exaggerated. With a plaster-of-Paris dressing carefully applied over the aseptic dressing the urine rarely gains access to the wound, and when it does it practically never produces suppuration.

As regards recurrences, Stiles does not give any statistics, stating that some of his cases have been too recently operated upon to be of value in this respect.

Radical Cure of Oblique Inguinal Hernia. Kennedy[1] gives the remote results of operations for the radical cure of oblique inguinal hernia in 103 cases. He states that after having practised Macewen's, Kocher's, and Bassini's methods, he has for several years made use of an operation different from all of these. His objections to Macewen's method are: 1. The treatment of the sac. 2. Imperfect closure of the canal.

His objection to Kocher's method is that the deeper structures are not touched and that the superficial structures do not make an efficient closure. Although he admits that Bassini's method has obtained almost universal favor, he believes there are objections which should prevent its adoption. First of these, he states, is "that the external oblique is split in order to reach the internal oblique and transversalis for the purpose of stitching them to the inner aspect of Poupart's ligament." He further states that no matter how perfectly the external oblique tendon is repaired after the deeper stitching is done, in the event of recurrence the scar in the external oblique tendon is almost sure to dilate, thus giving rise to a direct or ventral hernia rather than oblique. His experience with Bassini's operation seems to be based upon a study of 10 cases, 8 of which were traced, with 2 relapses—an experience manifestly too limited to justify an authoritative opinion as to the value of the method.

In regard to the objection raised as to the impossibility of perfectly repairing the cut edges of the aponeurosis of the external oblique, it seems to me that this is not borne out by the facts. The main point at issue when discussing the relative merits of the various operations for the radical cure of hernia is the efficiency of the method in obtaining a radical cure. If, as has been proven, Bassini's operation when properly done, cures the hernia in 99 per cent of the cases—a considerably greater percentage than obtained with any other method—it seems to me the question of whether a possible recurrence is direct or indirect is of minor importance.

My own experience in nearly 1400 cases of operation for the radical cure of hernia by Bassini's method shows that perfect repair of the external aponeurosis does take place, and in many of these cases, examined more than ten years after operation, the aponeurosis was found quite as firm on the one side as on the other.

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[1] British Medical Journal, October 1, 1904, p. 817

In the operation advocated by Kennedy, the sac is dealt with by Kocher's latest method. It is invaginated into the abdomen and brought out through the abdominal wall. The ligature is then cut off and the internal oblique and transversalis are stitched to the deep aspect of Poupart's ligament, but without cutting the external oblique tendon. The cord is not transplanted.

Personally I believe it is quite possible to make an accurate suture of the internal oblique muscle to Poupart's ligament without cutting up the aponeurosis of the external oblique, and I do not believe that the theoretical objection raised to the cutting of the external oblique warrants us in rejecting a procedure which, in practice, has proven entirely efficient.

Kennedy gives the results of operation in 103 cases operated upon more than a year ago; 96 were males, 7 females, and the youngest (for strangulation) was six months of age, the oldest seventy-four years. Twenty operations were done in patients from six months to three years of age. In 45.6 per cent. of the cases the sac was of the congenital type. Six cases were cæcal hernia and 1 hernia of the ovary. The mortality was really *nil*, since the only death in the series, occurring some weeks after operation as a result of tuberculous meningitis, can hardly be called an operative death.

The older cases, 20 in number, were operated upon by Macewen's method, all within the last five to seven years. Eleven of these cases were traced, with 2 relapses. Seventy cases were operated upon by the author's method, 54 of which were traced from one to five years, with only 1 relapse.

The Pathology and Treatment of Hernia in Children has been discussed in a most able and conservative way by Corner,[1] of London. Contrary to Stiles, Corner believes in the curability of hernia in young children by means of a truss. He states that the most popular truss for babies and young children is the worsted truss, or the one constructed from a skein of wool, but he adds that it requires little experience to demonstrate the general inefficacy of this form of truss.

I have frequently alluded to the great inferiority of the worsted truss to the spring truss.

With regard to the treatment of undescended testis in connection with hernia in children, Corner agrees with the opinion of McAdam

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[1] Lancet, August 20, 1904.

Eccles, and others that, entirely aside from the functional value of the undescended testis, such testes, by reason of some internal secretion, have a very important bearing upon the development of the male characteristics, and he adds, "If one studies the people with imperfectly descended testes the conclusion that one must come to is that the perfection of the male characteristics may be estimated by the amount of perfect testicular tissue present." He believes that the fact must be recognized that the production of spermatozoa is but one of the functions of the testes.

Corner considers it practically impossible to cure by means of a truss a hernia which has a congenital sac—*i. e.*, one in which the tunica vaginalis is continuous with the peritoneum.

He believes in treating children under the age of four to five years with a truss, excepting (*a*) in large or uncontrollable hernia; (*b*) in irreducible, difficultly reducible, or incarcerated hernia; (*c*) in strangulated hernia. At the age of about four years he thinks that all children should be operated upon unless there be special contraindications, such as (*a*) congenital sac (operation now being performed at the age of election); (*b*) imperfectly descended testis; and (*c*) if the hernia has been, and apparently will be, persistent in character.

The Results of Fifteen Hundred Operations for the Radical Cure of Hernia in Children, performed at the Hospital for Ruptured and Crippled between 1891 and 1904, have been reported by Dr. Wm. T. Bull and myself[1] in a paper read before the New York State Medical Association in October, 1904. Of 53,686 patients treated in the out-patient department of the hospital within the period stated, 50,961 were inguinal and 2725 femoral. Almost one-third of these cases, namely, 15,375, were children below the age of fourteen years. From December, 1891, to October, 1904, 1500 operations have been performed at the Hospital for Ruptured and Crippled for the radical cure of hernia, all of which, with the exception of 20, were in patients under fourteen years of age. These cases represent the worst cases of rupture, and in most instances a truss had been tried and failed. They are distributed over the various varieties as follows: 1435 operations for inguinal hernia; 39 for femoral; 13 for umbilical; 8 for ventral; 2 for congenital hernia of the umbilical cord; 2 for epigastric hernia; 1 for lumbar hernia, making a total of 1500 operations. Of this number 13 were strangulated, leaving 1487 non-strangulated cases.

The results of operation having shown that the question of mortality has been practically eliminated, we have of late adopted the plan of advising operation in most cases of hernia in children past the age of four years, unless the hernia be very small. This plan is especially followed in dispensary cases in which it is so difficult to get the truss properly looked after at home.

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[1] Medical Record, March 18, 1905.

Of the 1435 operations for inguinal hernia, 251 were performed upon 217 female patients, with no death and no relapse. The method employed is practically identical with Bassini's operation in the male, the round ligament being allowed to drop back into the lower angle of the wound without transplantation.

The method of operation employed in the great majority of cases of inguinal hernia in the male was Bassini's, the only change in the technique having been the substitution of kangaroo tendon for silk in the buried sutures, and that in most cases a suture was placed above the cord in addition to those below. In 125 cases the cord was not transplanted, but brought out at the lower angle of the wound and the external oblique being sutured to Poupart's ligament—exactly the same as in inguinal hernia in the female. This method is known in Germany as Wölfler's method without transplantation of the rectus muscle. In this country it is frequently known as Ferguson's method. Wölfler's cases were not reported until 1895, Ferguson's in 1899.

The first cases operated upon by Dr. Bull and myself[1] at the Hospital for Ruptured and Crippled occurred in 1892, and were reported in 1895. The results in these 125 cases operated upon at the Hospital for Ruptured and Crippled while very good, are not equal to those following operations in which the cord was transplanted.

Although femoral hernia is supposed to be very rare in children, we have operated upon 39 such cases at the Hospital for Ruptured and Crippled, 28 of which were in children below fourteen years of age, the youngest being two years old. Of 2179 cases of femoral hernia observed at the hospital since 1890, 69 occurred in children under fourteen years of age, or a little over 3 per cent.

The method employed in most cases has been that of high ligation of the hernial sac with a purse-string suture of kangaroo tendon, bringing the floor of the canal in contact with the roof.

Thirteen of the cases were traced from two to eight years without a single relapse.

In 85 cases an undescended or partially descended testis complicated the operation.

Up to recently we have advised against operation in hernia with undescended testes in infants and young children up to the age of eight or ten years unless the hernia was of large size; the reason for this being that the testis often descends of itself if left alone and no truss is applied.

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[1] Annals of Surgery, 1895.

The rupture is not likely to become strangulated, as the testes prevent the intestine from getting outside the external ring, which we have shown to be the cause of strangulation in children. Inasmuch as an operation for the cure of the hernia is nearly always necessary, even after the testis has come down, we do not now postpone operation quite as long as formerly.

As regards operation, we now employ Bassini's method without transplanting the cord, thereby gaining an appreciable lengthening of the latter and securing the testis a lower position in the scrotum. While it is of great importance to thoroughly free the cord, sacrificing some of the veins, if needs be, and cutting away the fascia about the veins, we think the step advised by Bevan of separating the veins high up in the iliac fossa by blunt dissection with the index finger likely to involve risk of severe hemorrhage. It is very important to so close the opening at the external ring that the testis cannot re-enter the canal even if it should retract thus far. While we have not observed any relapses in this class of cases, the testis has retracted to the external ring in a considerable number of cases, especially the earlier ones.

Strangulated Hernia in Children. We have found strangulation to be much more common during the first two years of life than during the next decade. Of 13 operations performed for strangulated hernia in children between the ages of thirteen days and fifteen years, 5 were under one year and 7 under two years. Only one case of strangulation was observed between the ages of three and a half and fourteen years. The mortality of operation in this series has been *nil.*

Umbilical Hernia in Children. Practically all cases of umbilical hernia in children may be cured by mechanical means. The method employed by us consists in applying a two-inch strip of zinc oxide rubber adhesive plaster which entirely encircles the abdomen and holds in place a small pad, usually made of a wooden button mould one inch in diameter and covered with adhesive plaster. This is changed once every one or two weeks. Ordinary cases are cured in about a year.

In the few cases of umbilical hernia in which operation was indicated we have found that closure of the wound in three layers, without any overlapping, has been sufficient to effect a cure. Thus far we have observed no relapses in this group of cases.

RESULTS. Six hundred and one cases of hernia in children have remained sound from one to twelve years; 651 from six months to twelve years. In 1076 cases of inguinal hernia in the male operated upon by Bassini's method since December, 1890, there have been 6 relapses; in 125 cases in which the cord was not transplanted, 5 recurrences have been observed. In 251 operations for inguinal hernia in the females no relapses have been noted

The mortality in the above reported series has been 0.26 per cent. (4 deaths in 1500 cases).

Radical Cure of Hernia. Hilgenreiner[1] publishes a report covering 828 operations for the radical cure of hernia performed at Wölfler's clinic, Prague, from 1895 to 1902. He prefaces his remarks by referring to the statistics of Berger, who on a basis of 10,000 examinations declared hernia to be present in 7 per cent. of the male and 2 per cent. of the female population, a proportion which entitles hernia to front rank among surgical diseases and fully justifies the importance that is given the discussion of operative measures devised for its cure.

The 828 operations covered by Hilgenreiner's report were performed upon 770 patients; of these 471 were free herniæ and 357 strangulated. Of the non-strangulated 374 were observed in men, 46 in women, while of the strangulated cases 149 were men and 205 women.

A table showing the time of development of the hernia in the cases treated at the Prague clinic shows that while inguinal hernia is frequently enough congenital, or acquired in early life, femoral and umbilical hernia at this stage are comparatively rare.

Regarding hereditary predisposition, Hilgenreiner states that 122 of 267 cases questioned regarding this point gave a history of heredity.

He believes, however, that if the true facts were known in all cases, this percentage would be found to be considerably larger. Nussbaum estimated two-thirds of all herniæ to be hereditary, while Berger in 7542 cases found only 2079, equal to 27.05 per cent. hereditary.

The operation for non-strangulated inguinal hernia was performed 446 times in 397 patients; that for femoral hernia 15 times in 13 patients. The hernia was right-sided in 273 instances, left-sided in 188.

As to the duration of the hernia prior to operation it is stated that in 444 cases in which such information could be obtained, the hernia had existed less than a year in 133 cases; from one to ten years in 227 cases, longer than ten years in 84.

Of the inguinal herniæ 77 were bilateral; twice a femoral hernia existed on the same side; 36 were irreducible omental hernia; more or less pronounced ectopia or undescended testis was seen in 21 cases, 6 times associated with atrophy of the testis.

The closure of the hernial opening was attempted in various ways. In 33 cases operated upon during the first two years, Frey's method (transplantation of the cord into a slit of Poupart's ligament) was employed; in 17 cases closure was obtained by a simple suture, according to Czerny, in a very few according to Bassini, and in all the remaining cases Wölfler's method was practised.

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[1] Beiträge z. klin. Chir., 1903–04, Bd. xli. p. 373.

Hilgenreiner calls attention to a common error with regard to the technique of Wölfler's method. He states that some of the steps of the operation were conceived by Wölfler almost simultaneously with, although entirely independently from, that of Bassini, in 1888. Wölfler's method differs from Bassini's, as he does not transplant the cord, but allows the same to remain in its normal position, utilizing the rectus muscle to strengthen the anterior wall of the canal. Although of 209 previously published cases the cord was transplanted only in 6 cases, the step being promptly discarded as being unpractical and superfluous; transplantation of the cord is always described as the essential feature of Wölfler's method, while in reality it is about the only distinguishing feature of Wölfler's from Bassini's operation, all other steps being practically the same.

As to wound healing, we find that of 435 operations for free herniæ, primary union was obtained in 383 cases; 52 cases healed by secondary union. While in 1895–96 primary union was seen in only 30 out of 57 cases, in 1900–01 only 2 of 186 cases healed by secondary intention. Rubber gloves are now worn by both operators and assistants.

Of 299 cases traced—*i. e.*, 77 upward of one year, the remainder from two to seven years, 266 were permanently cured, in 28 a relapse was noticed. In the 33 cases operated upon according to Frey and Czerny there were 7 relapses; in 94 cases operated upon according to Wölfler, without transposition of the rectus muscle, 8 relapses; in 163 operated upon by Wölfler's method with transposition of the rectus, 11 recurrences were noted. Of the 4 Bassini operations done, 2 relapsed. Counting only those of the cases traced upward of two years and that were operated upon by Wölfler's method with transplantation of the rectus, we find 98 cases with 7 relapses, equal to 7.1 per cent. These relapses occurred almost throughout in individuals with pronounced hereditary or individual predisposition; in only 2 cases could a direct cause for the relapse be assigned. It is furthermore stated that the relapses were noted only in adult men; among the re-examined 14 women and 25 male and female children up to the age of fifteen years there was no relapse. Goldner's statistics (1895 to 1900) showed 7.5 per cent. of recurrences after Bassini's operation in 446 cases traced. It must be remembered, however, as Hilgenreiner points out, that Goldner's material was vastly more favorable than theirs, since the former operated bilaterally in all cases of inguinal hernia, which accounts for his 800 radical operations in 476 patients; while at the Prague clinic they did only 471 operations in 420 patients.

Pott, in his collective statistics covering 1713 cases operated upon by Bassini's method, gives 9.9 per cent. relapses.

The mortality of operation in the non-strangulated cases during the first six years covered by Hilgenreiner's report was 0. Within the last year one patient succumbed to postoperative pneumonia on the tenth day after operation, the wound having healed by primary union. This would give a death rate of 0.23 per cent. in 421 cases operated upon.

Potts gives a mortality of 0.7 per cent. in his collection of 2401 cases operated upon since 1895.

Hilgenreiner believes that the advantages of Wölfler's operation over that of Bassini's lies principally in the fact that he (Wölfler) allows the cord to remain in place, which not only greatly simplifies the procedure, but also avoids complications arising from injuries done to the cord or vessels. Inflammatory processes and atrophy of the scrotum, tearing of the vas deferens, gangrene of the scrotum, etc., all disturbances frequently mentioned in statistics of Bassini's operation, never occur after Wölfler's operation. Personally, I have never seen any of these complications after Bassini's operation, and see no reason why they should occur.

With regard to non-strangulated femoral hernia, only 15 operations in 14 patients were performed at the Prague clinic. Frey's method was employed, the same consisting in freeing, ligature, and extirpation of the sac; suture of hernial opening so as to fix the exposed inner third of Poupart's ligament which is easily pulled downward and backward to the likewise exposed pectineal muscle or pectineal fascia and periosteum of the horizontal ramus of the pubis by means of a few sutures. All operations were successful, and so far as could be ascertained no relapses occurred.

Of the non-strangulated umbilical hernia, 5 in number (4 female, 1 male), 4 were re-examined two years after operation; 2 were found permanently cured, while in the other 2 a slight recurrence was observed.

The number of incarcerated herniæ observed at the Prague clinic within the eight years covered by the report is 362 in 354 patients. Of these 5 died prior to treatment, so that only 349 patients with 357 strangulations were treated.

The proportion of the inguinal, femoral, and umbilical herniæ was about as 10:7:1 (208, 134, 20). Two hundred and sixty-one, or almost three-fourths of the total number of incarcerations occurred in patients above forty years of age; the youngest case was that of a boy four years of age, the oldest a woman of eighty-seven. In both cases primary resection of the gangrenous intestine was successfully done.

As to the participation of the sexes, it is stated that 202 were women, 160 men. Adding to these the cases reported by Berger, it appears that the disposition to strangulation is more than four times as great in women as in men, which difference is explained by the predominance in women of femoral and umbilical hernia (91 per cent. and 84 per cent.), in which variety strangulation is much more frequent than in inguinal hernia.

In 257 cases the contents of the sac is stated. In 48.6 per cent. it was the small intestine; in 28.8 per cent. small intestine and omentum; in 14.8 per cent. omentum alone; the remaining 7.8 per cent. were cases with rare contents of sac.

While Hilgenreiner points out the dangers of forced taxis, he believes it justified in recently strangulated herniæ of long standing, especially if the patients are well advanced in years. He reports 66 cases treated in this way without mortality. Simple herniotomy was performed 206 times (116 inguinal, 79 crural, and 11 umbilical), with a mortality of 11 per cent. It should be stated, though, that the mortality decreased from almost 36 per cent. in the first year of his report to 5 to 6 per cent. in the last two years.

In cases of gangrene of the intestine, primary resection with Murphy's button for the anastomosis was the routine procedure. The mortality in 55 cases of primary resection was 45.4 per cent.

The establishment of an artificial anus with secondary resection of the intestine was resorted to only in desperate cases with fecal abscess or phlegmon. Only 1 out of 11 recovered, 8 dying even before secondary resection could be done.

In the entire series of 357 cases of strangulated hernia reported by Hilgenreiner, there were 67 deaths equal to 18.7 per cent. Forty-four of these were gangrenous or suspected to be so; 23 per cent. non-gangrenous herniæ, giving for the former, 85 in number, a mortality of 51.7 per cent.; for the latter, comprising 272 cases, 8.5 per cent.

Hilgenreiner in his somewhat lengthy criticism of my results published in the *Transactions of the American Surgical Association*, 1903, states that most of my material was in children, in which his own statistics show no relapses.

While I am willing to admit that the results in children ought to be slightly better than in adults, Hilgenreiner's statistics show that of 294 cases traced at Wölfler's clinic only 14 were children under the age of ten years, a number manifestly too small to form any conclusions as regards the percentage of permanent cures. Sixty-one of the cases were from eleven to twenty years of age, 146 from twenty to thirty years of age, or 207 cases from eleven to thirty years of age, at which period of life the results have been almost, if not quite, as good as those in children under the age of fourteen years. Only 33 of the cases traced were over forty years of age.

Up to the present time I have operated upon nearly 1500 cases of inguinal and femoral hernia, of which more than 580 occurred in adults, and the results in adults are almost as satisfactory as those obtained in children. Sixty of these were femoral hernia, with 1 relapse, leaving 450 cases operated upon by Bassini's method with seven relapses In my operations for hernia in children operated upon by Bassini's method, over 800 in number, I have had only three relapses.

The results of operation for the radical cure of hernia at the Heidelberg clinic[1] during 1902 and 1903 are of interest. In 1902 they operated upon 185 cases, 128 male, 51 female, and 6 doubtful; 112 were for non-strangulated inguinal hernia, 103 males, 9 female; 17 were incarcerated, 29 were femoral, 11 reducible, 18 strangulated.

As regards the method of operation, it is stated that Bottini's method was used in 70 cases of inguinal hernia; Czerny's in 31, and Kocher's in 1. There were no deaths in the non-strangulated cases; 3 deaths in the strangulated cases.

As regards wound healing, we find that in 198 operations performed there was suppuration, superficial and deep, in 31 cases.

Non-absorbable Suture Material. The objections to the use of a non-absorbable suture material for the radical cure of hernia, as frequently pointed out by me, have been strongly emphasized anew by Macewen in his address in "Surgery" before the last meeting of the British Medical Association.[2] He says: "Some conceive the idea that it would be good to have a material by the aid of which the parts could not only be brought together, but one which would keep them in permanent contact. At the present moment many investigators content themselves by aiming at a sterilized material for sutures and ligatures, believing that asepticity is the sole requirement."

Macewen believes that asepticity is only one of the requirements, a further one being that the sutures should remain in the tissues for time sufficient to effect their purpose and then be eliminated as rapidly as possible. These requirements apply to ligatures as well as sutures. If a suture remains longer than sufficient to accomplish its purpose, it is simply useless, dead material, capable of producing irritation. He adds, "some surgeons have introduced wire sutures in the belief that they would be able to bring together and maintain in apposition tendinous and aponeurotic structures in inguinal hernia." And as an illustration of the futility of such hope he gives his own experience in 5 cases in which gold wire had been used by other surgeons, the cases later coming under his own observation, 3 for recurrence of the hernia and 2 for strangulation. In three instances the wire was found lying loosely in the tissues and quite free from the aponeurosis which it had been introduced to maintain in contact. In 1 case it was embedded in granulation tissue so near the surface that it was clearly about to be extruded. In the 2 cases of strangulated hernia a loop of wire which had been introduced through the aponeurosis at the first operation was found free and the bowel had passed right through the loop and become strangulated and constricted as if in a tight ring. In one of these cases perforation had occurred at the point of constriction by the wire.

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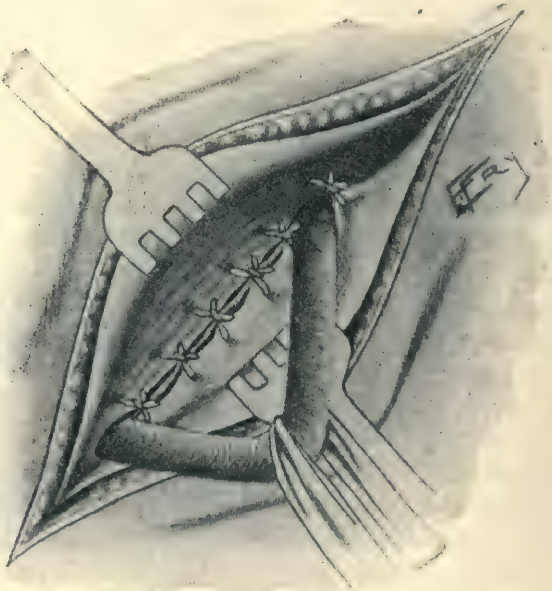
[1] Beiträge f. klin. Chir., 1904

[2] Lancet, August 6, 1904.

My own experience at the Hospital for Ruptured and Crippled in upward of 30 cases has already been referred to in previous numbers of PROGRESSIVE MEDICINE. These cases together with Macewen's furnish very strong reasons, I believe, for abandoning non-absorbable sutures in operations for hernia.

FIG. 1.



Bassini's operation (deep sutures), showing extra suture above the cord. (COLEY.)

Management of Hernia in Infancy and Childhood. In a paper[1] read before the Section on Diseases of Children of the American Medical Association, in June last, I have fully stated my views as to the treatment, both mechanical and operative, of hernia in children.

The method employed in most of the operative cases was the Bassini method, with the modification of first placing one suture above the cord (Fig. 1) in addition to those below, to prevent any widening of the internal ring in an upward direction, and of substituting for the buried silk sutures used by Bassini absorbable sutures—*i. e.*, chromicized kangaroo tendon.

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[1] The Management of Hernia in Infancy and Childhood, with Results of Operative Treatment, Journal of the American Medical Association, January, 1905.

After the sac has been tied off well beyond the neck, at a point where it has begun to widen out into the general peritoneal cavity, the deep layer of sutures is placed as follows: With a small tape the cord is held up and the first suture is placed so that it just touches the lower border of the cord when the latter is brought vertically to the plane of the abdomen; three to four more through the internal oblique and Poupart's ligament will suffice to close the canal to the symphysis pubis. Then the suture above the cord (Fig. 1) is inserted. This is not a part of Bassini's technique, but I believe it is of decided aid in preventing a relapse, as it strengthens the only weak point in the operation. The incision in the aponeurosis is then closed from above downward by a small continuous suture of kangaroo tendon and the skin with catgut. No drainage is used, and the wound is dressed very carefully with sterile gauze, cotton, a firmly applied spica bandage, and finally a plaster-of-Paris spica is applied to give perfect rest to the parts. The wound is dressed the seventh day, and the patients are kept in bed two weeks and allowed to go out in from two and one-half to three weeks, wearing a spica bandage until four weeks have elapsed, after which time no support is worn.

Autoplastic Sutures in Hernia. Dr. L. L. McArthur,[1] of Chicago, still advocates the autoplastic sutures in hernia, and before the last meeting of the American Medical Association at Atlantic City, he read his results after three years' work with this suture. He believes that he has demonstrated:

1. That it is an easy matter to split the tendinous aponeurosis of the external oblique from the external ring to the commencement of its muscle belly by simply lengthening the usual splitting of this structure.
2. From the cut edges of this, by carefully paralleling its fibres, that one can secure two strips of living tendon averaging four to five inches in length with which the structures to be apposed can be sutured.
3. That the use of such sutures can be adapted to any of the recognized procedures for the radical cure of hernia.
4. That, unlike any of the other numerous plastic operations advanced, the material lies directly in the wound itself instead of requiring extensive dissections or abnormal displacement of important structures.

He believes that this suture can be applied equally well with Bassini's, Macewen's, or Halsted's operation. Since his preliminary report of 12 cases treated by this method, he has now performed 93 consecutive operations on 85 cases, 82 males and 3 females, ranging in age between

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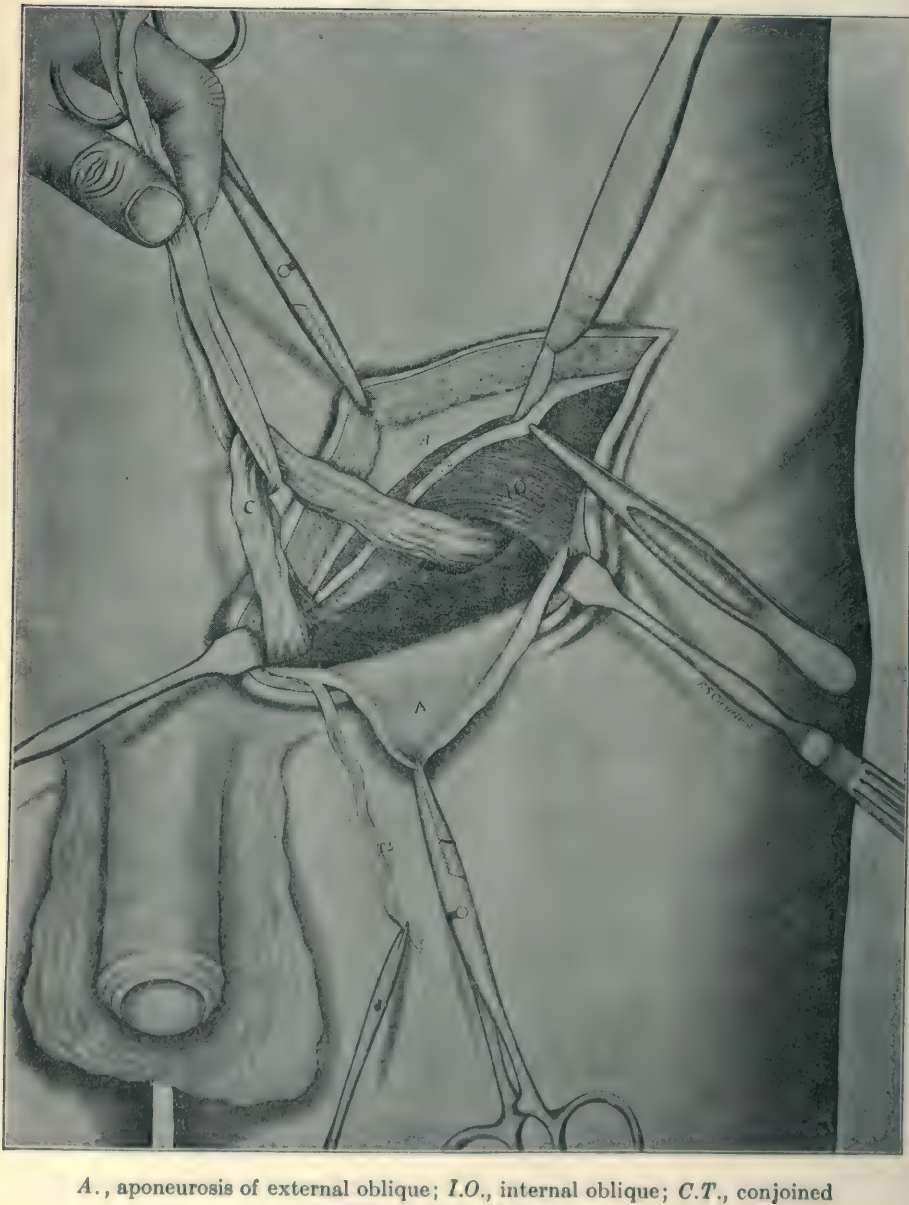
[1] Journal of the American Medical Association, October 8, 1904, p. 1039.

Fig. 2.

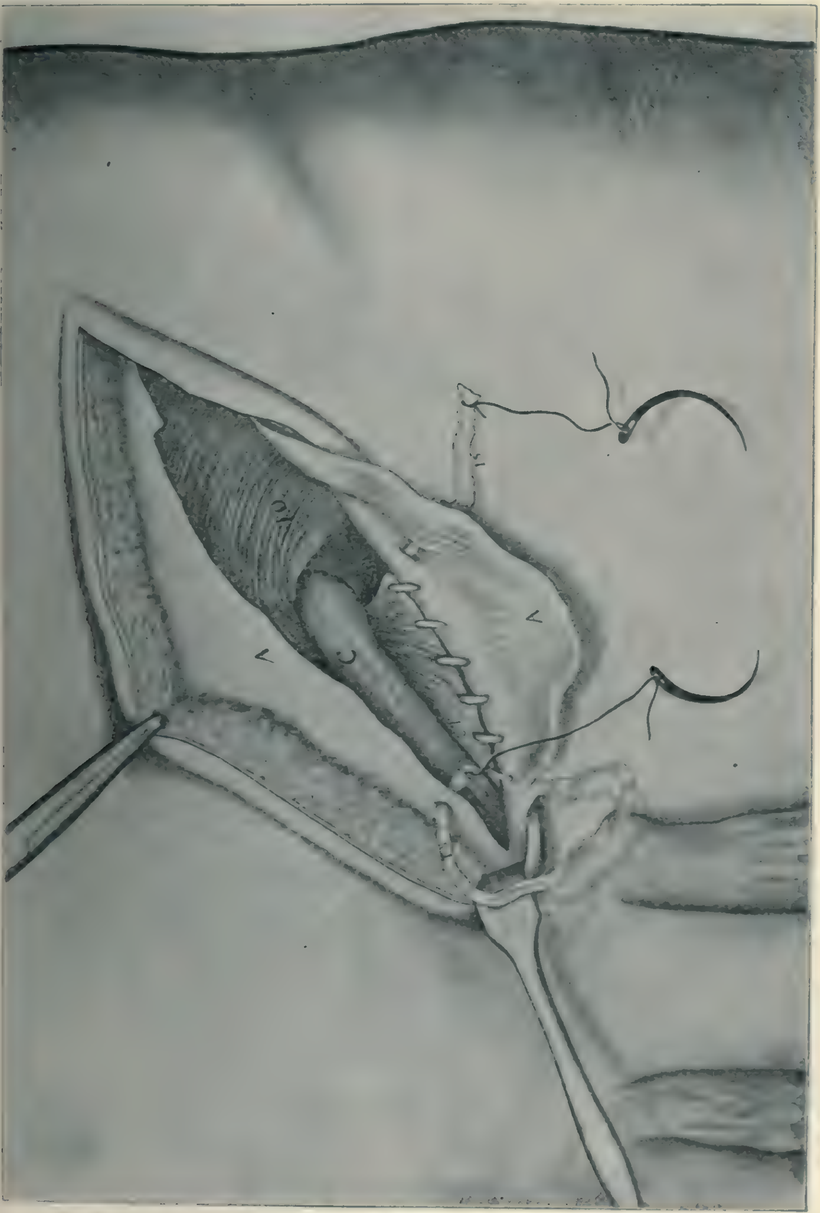


A., aponeurosis of external oblique; *I.O.*, internal oblique; *C.T.*, conjoined tendon; *T.S.*, tendon suture

six months and seventy-eight years. In 8 cases the hernia was double. Primary union was obtained in all except 2 cases (Figs. 2, 3, and 4).

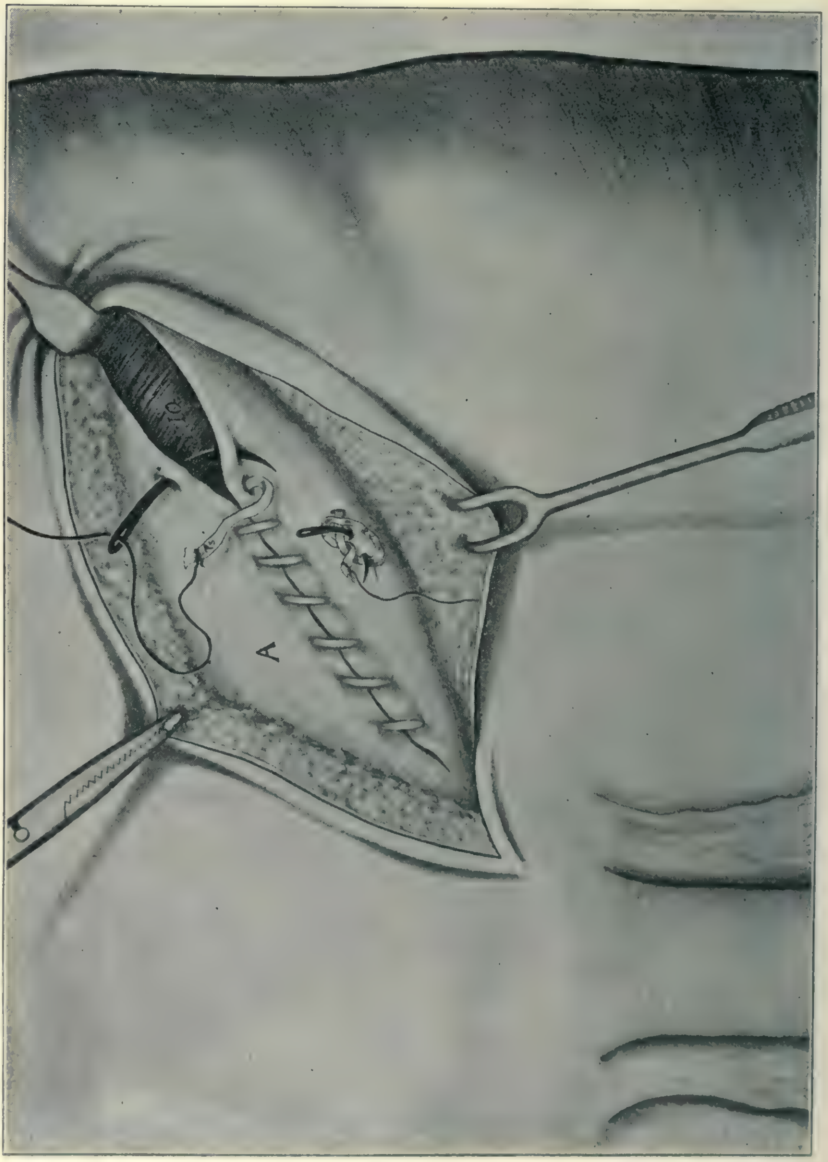
The author's plea for the method is this: "It is logical that if the identical technique is followed, using these living strips as aseptic animal

FIG. 3.



A., aponeurosis of external oblique; *I.O.*, internal oblique; *T.F.*, transversalis fascia; *C.*, cord; *C.T.*, conjoined tendon; *T.S.*, tendon suture sutures are used, and a primary union results, that if they die and be absorbed they accomplish all that the foreign material does, while if

Fig. 4.



A., aponeurosis of external oblique; *I.O.*, internal oblique; *T.S.*, tendon suture.

they live (as experiment seems to prove) they remain to offer permanent resistance to future stretching."

Dr. McArthur's cases certainly prove that it is possible to effect a radical cure of hernia by means of an autoplastic suture. At the same time, anyone who has had a large experience in the radical cure of hernia must admit that the aponeurosis of the external oblique varies greatly in different subjects. In some cases with a large scrotal hernia the lower portion of the external oblique about the external ring is greatly thinned and offers very poor material for an autoplastic suture. The disadvantages of non-absorbable sutures in hernia, however, have been shown to be so great as to furnish strong reason for adopting McArthur's method, had we nothing else to fall back upon. As matters stand, however, we have abundant proof of our ability to perfectly sterilize ordinary absorbable sutures—*e. g.*, chromicized catgut or kangaroo tendon. We have, furthermore, sufficient evidence to show that such sutures remain unabsorbed sufficiently long to effect a radical cure of the hernia in nearly all cases. With such sutures the technique is simpler and the operation can be more quickly performed. Hence I believe they are more desirable.

Cure of Hernia in the Army. Banister, surgeon of the United States army at Manila, reports 100 cases of radical cure of hernia without mortality in the army, and with wound infection in but a single case. As far as these cases could be traced, there were only three slight relapses. Banister is a very strong advocate of Bassini's method of operation, and this method was used in all of his operations. He believes that every operable case of hernia between the ages of twenty to fifty years, without disease of vital organs, should be subjected to radical operation, as is the custom in the military service since September, 1895, when the War Department issued an order making radical operation for hernia the routine treatment in the United States army. Since this time several hundred operations have been performed by the officers of the medical department, with only one death, and with a rate of relapses which, he states, is so small as not to merit consideration.

Strangulated Hernia. Erdman,[1] in a paper upon this subject, reports 58 cases of strangulation in inguinal, femoral, and umbilical hernia. Twenty-six of the cases were inguinal hernia, with 5 deaths. In every one of these cases of inguinal hernia the cause of strangulation was found in the external abdominal ring, rather than in the neck of the sac.

This is a point which I have frequently alluded to in connection with strangulated hernia in children. It furnishes further evidence of the fact that strangulation of the neck of the sac, so frequently mentioned in text-books and surgical literature, is extremely rare.

[1] Journal of the American Medical Association, March 12, 1904, p. 47.

Erdman reports 19 cases of strangulated femoral hernia, 4 in males and 15 in females. Excision of the gut was found necessary in 3 cases; two of these excision cases recovered and one died. There was one other death in this series, making 16 recoveries in strangulated femoral hernia.

Erdman reports 6 cases of strangulated umbilical hernia with only 1 death, an extremely satisfactory result, as the mortality after operation in this condition has usually been recorded at from 50 to 80 per cent.

As regards the treatment of strangulated hernia Erdman believes that taxis should never be used for a moment after the diagnosis of irreducibility has been made. His case of femoral hernia reduced *en masse,* he believes, teaches a very powerful lesson as to the dangers of taxis.

Dr. George Tully Vaughan,[1] of Washington, D. C., presents an analysis of 25 cases of strangulated hernia treated by operation. They were observed in a series of 115 operations for inguinal and femoral hernia. Only 1 of his cases was complicated with undescended testicle; two were pro-peritoneal or interstitial herniæ. He reports 6 deaths, or a mortality of 24 per cent. In 6 cases resection of gangrenous intestine was performed, with 3 deaths, all due to general peritonitis, which existed at time of operation.

At the Johns Hopkins Hospital 64 operations for strangulated hernia were performed from 1889 to 1899, with 19 deaths, equal to 29.68 per cent.

Gibson in his collective statistics covering ten years, from 1888 to 1898, reports 226 resections of gangrenous intestine with immediate reunion, giving a mortality of 26 per cent., while in 26 cases in which the Murphy button was used the death rate was 22 per cent.

"**Clinical and Anatomical as well as Experimental Contributions to the Knowledge of Inguinal and Crural Bladder Hernia,**" is the title of an interesting paper by F. Karewski.[2] He states that while our knowledge of the subject has been much enriched during the last few years by numerous and exhaustive contributions to the literature, an essential point, namely, the diagnosis is still an unanswered question. It can rarely be made before operation, and even during operation we often fail to render it. According to Alessandri's compilation in 1901, covering 223 reported cases, the diagnosis, was made 18 times without being confirmed either by operation or post-mortem examination; 25 times a vesical hernia was found on autopsy, and in but 5 cases was the condition recognized before operation, in 147 during operation. In the latter series the bladder remained intact in only 11 instances. These data certainly show that a correct diagnosis of cystocele is very rarely made.

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[1] Medical News, December 24, 1904.

[2] Arch. f. klin. Chir., vol. lxxv. No. 2, p. 395.

As regards the genesis of inguinal and crural cystocele we are, likewise, still in the dark. Since in more than one-half of the cases observed excessive development of prevesical fat was found, this hyperplasia of the fatty layers has often been looked upon as of etiological importance, although opinions differed as to the exact nature of the causative relation of this sign. Weakness and overdilatation of the bladder wall was also supposed to be an important predisposing factor in the formation of vesical hernia. However, as Lotheissen correctly points out, this condition does not seem to have very frequently existed, since it is rarely mentioned in the published reports of cases. Nor does the age of patients seem to have any influence upon the development of these herniæ, for one-half of the cases reported occurred in subjects below fifty years of age, even young children being not excluded. It is certain, however, Karewski states, that thus far no case of congenital bladder hernia has been observed, all being acquired.

It has, furthermore, been pointed out that the trouble is more frequent in men than in women. According to Alessandri only 22 per cent. of the cases reported occurred in women. To this Karewski replies, that if we remember that vesical hernia generally occurs in connection with inguinal hernia, which is much more common in men than in women, we need not wonder at the large proportion of bladder hernia in men.

Karewski reports 5 cases of bladder hernia. Of these 1 was clinically so well characterized that there can hardly be any doubt as to the diagnosis, although no operation was performed. In two instances the diagnosis was confirmed by the cystoscope; in 1 case the condition was recognized during operation, and once the bladder was accidentally injured, a fact which became manifest only later, during the period of wound healing. Three of his cases were crural hernia, which is not remarkable considering that four of his patients were women, in whom crural hernia is known to be more frequent than in men.

The view held by some that parts of the bladder very rarely bulge into the crural canal, Karewski does not believe justified. He calls attention to Krjnkow's recently published collection of 45 cases of cystocele in femoral hernia which, adding his own, makes 48 cases in a total of 250 cases so far published, or about 1 to 5, while the proportion of crural to inguinal hernia, according to Koenig, is only 1 to 9. In view of these figures the claim of a predilection on the part of the bladder to wander into the inguinal canal is not warranted.

Karewski has made extensive experiments upon the cadaver, which show that there is a close connection between the hernial openings and the bladder covering in persons of all ages without displacement of the bladder and lipoma and without any abnormalities of the organ; even slight traction (high ligation without previous careful dissection of the peritoneum and prevesical fat) may cause a bulging of the bladder wall and the cutting of the ligature may easily give rise to a fistula. The larger the hernial opening the greater the danger of injuring the bladder.

There seems to be no doubt, Karewski states, that in cases with large hernial openings and in old ruptures, even in the absence of adhesive processes, a permanent lateral displacement may easily become established, and this, without a real cystocele, may render possible incarceration of the bladder by the ligature, thus giving rise to the later formation of a fistula.

Karewski, therefore, concludes that we must in all operations for hernia reckon with the possibility of injuring the bladder, but there is no justification for calling this occurrence a cystocele. One might better say that in a certain number of cases portions of the bladder wall must be looked upon as integral parts of the hernial covering, and that, therefore, the utmost care should be exercised to prevent injuring the same. In view of this possibility, he thinks that undoubtedly a large proportion of so-called vesical hernia really belongs into the category of accidental injuries to the bladder, and should be struck from the list of true bladder hernia.

Karewski considers the cystoscope the sovereign means of rendering a correct diagnosis in these cases. It alone enables us to recognize absolutely reliable signs, since it shows the relation of the displacement to the location of the hernia. On the other hand, he states that in spite of the importance of rendering the diagnosis of vesical hernia, it is not necessary in order to enable us to avoid injuring the bladder. This can be done if proper care is taken during operation.

Ovarian Hernia. A very rare variety of hernia, namely, ovarian hernia, is described at length by Heegard.[1] He states that the first collection of this variety of herniæ was made in 1813 by Deneux, and covered 14 cases: 9 inguinal, 1 crural, 1 vaginal, 1 ventral, and 2 ischiatic. The next series was collected by English in 1871 and covered 38, of which 27 were inguinal, 9 crural, 1 ischiatic, and 1 obturator. The latest compilation is that of Bitzako, published in 1892; it comprises 113 cases, 91 of which were inguinal, 17 crural. Most authors emphasize the great difficulty of diagnosing the condition.

Inguinal ovarian herniæ, in contradistinction to other forms of ovarian hernia, are usually divided into two groups: congenital and acquired hernia, the former preponderating. Of the 27 cases of inguinal ovarian hernia collected by English, 17 are designated as congenital. Puech, in a series of 88 cases, gives 54 congenital, 17 doubtful, and 17 acquired cases. Of the 91 cases reported by Bitzako 66 are stated to have been congenital.

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[1] Arch. f. klin. Chir., vol. lxxv. No. 2, p. 425.

Heegard calls attention to the fact that the definition accepted for congenital hernia in general does not apply in cases of congenital ovarian hernia. In the latter the term "congenital" is supposed to mean that the prolapse of the ovary took place during fetal life, so that at birth the ovary had already descended into the inguinal canal or the labia major. The intrauterine origin of a hernial sac does not in these cases constitute the hernia a congenital one. He emphasizes the weak points of this distinction, calling attention to the difficulty of proving in the so-called congenital cases that the prolapse of the ovary actually took place before birth, and explains that this assumption of a fetal prolapse in this class of cases depends upon the belief of the normal presence of the canal of Nuck in the female fœtus, a supposition which he, the same as Duplay and Beurnier, denies. He bases his denial upon careful investigations made upon 7 female fœti, in none of which, he states, could the slightest sign of a peritoneal sac following the round ligament through the inguinal canal be detected. He, therefore, declares that those who build up theories as to the pathogenesis of the so-called congenital inguinal ovarian herniæ on the above assumption start from wrong premises. Personally, he believes that these herniæ, the same as all other varieties, develop after birth—*i. e.*, the prolapse of the ovary takes place after birth. He cites a case which he thinks absolutely proves the correctness of his assertion that the prolapse of the ovary is not caused by any influence of the ligamentum that corresponds to the supposed action of Hunter's gubernaculum upon the testicle, as is generally claimed.

Crural ovarian herniæ, as the above-mentioned statistics show, are far more rarely observed than inguinal ovarian herniæ. The explanation for this, Heegard states, lies in the fact that the ovary during a certain period of childhood assumes a position from where it can easily pass into the inguinal canal, provided a peritoneal sac is present in this canal. During this period the ovary is situated further away from the crural canal. Furthermore, the conditions for the development of a hernia—*i. e.*, the presence of a hernial sac, are more favorable in regard to the inguinal than the crural canal, at least in childhood; crural ovarian herniæ are, therefore, more common in later life.

Heegard states that thus far the ovary has been found to constitute the contents of the sac in 4 cases of ischiatic hernia.

As regards the function of the ovary when contained in a hernial sac, this remains unimpaired. The subjective symptoms vary greatly. In childhood, the time when the prolapse of the ovary most frequently occurs, there are hardly any symptoms, and so long as no pathological changes set in the little tumor often entirely escapes notice. It is usually not until puberty is reached that the ovary begins to cause trouble, often becoming exquisitely sensitive to the touch. One of the diagnostic signs of the disease noticed in later life is the regular periodical enlargement of the organ. Furthermore, the shape of the tumor is most characteristic, at least in cases in which no pathological changes have taken place. It is well defined, more or less freely movable at its upper pole. Two parts may be distinguished, namely, an egg-shaped tumor below and a round, cord-like prolongation of the same above, the latter extending through the open inguinal canal into the abdomen. The open inguinal canal and elongation of the tumor into the abdomen prove that we have to deal with a hernia.

As regards the treatment our foremost aim must, of course, be the preservation of the ovary whenever possible. In the few cases in which the ovary is reducible, taxis may be employed, provided no pathological changes are discernible. A truss should then be worn. In all other cases herniotomy should be done as soon as the nature of the trouble has been determined, and here the utmost care must be taken to determine the condition of the ovary; if healthy it should be reduced through the widened hernial opening, the hernial sac being ligated and the canal closed. If the organ is found cystic or otherwise degenerated it will have to be amputated, after careful ligation of the pedicle, above the torsion.

Radical Cure of Crural Hernia. Carl Goebel[1] brings a comparative review of all the various methods in vogue for the radical cure of crural hernia and also describes a new procedure of von Mikulicz's, adding the report of a case of large crural hernia successfully operated upon by the new method. The principal feature of the same is that of employing the periosteum of the os pubis for the formation of a double flap. The technique is briefly as follows: isolation, ligation, and submerging of the hernial sac; incision down to the bone, from the tuberosity of the pubis to the vessels, in a frontal direction, and slightly anterior to the crest of the pubis. Formation of an upper and lower periosteal (periosteal-muscle-fascia) flap out of the os pubis, if necessary, with sagittal section across the bone at the outer and inner end of the frontal incision. Suture of the upper (inner) periosteal flap to the outer border of the ligament; subcutaneous suture of the remaining fascia; suture of skin.

The advantage of this method, it is believed, is that the turned-up periosteum, joined to Poupart's ligament, causes an ideal closure of the crural canal at its entrance at the very beginning of the femoral infundibulum. The results from the simpler method of purse-string sutures have been so nearly ideal that there is seldom need of resorting to the difficult and complicated methods above described.

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[1] Beiträge z. klin. Chirurgie, 1904.

SURGERY OF THE ABDOMEN, EXCLUSIVE OF HERNIA.

By EDWARD MILTON FOOTE, M.D.

THE STOMACH.

Operations upon the stomach have been performed on account of traumatic perforations, ulcers, and their sequelæ, and cancer. These three great groups will always include most of the cases of gastric surgery; but there are some other conditions, less common, for which the aid of the surgeon may be invoked. Five such conditions will be briefly mentioned—viz., congenital stenosis of the pylorus, congenital hour-glass stomach, non-perforating traumatism, cirrhosis, and volvulus.

Congenital Stenosis of the Pylorus. Many surgeons scoff at the diagnosis of a congenital stenosis of the pylorus, but each year there are more reports of cases, and as attention is more generally directed to this condition it is likely to prove more common than was previously supposed. As the two chief symptoms—vomiting and constipation—are common in infants, one should, if possible, recognize the other symptoms early, before the strength of the child is too far gone to permit of successful operation. These symptoms are increased peristalsis and dilatation of the stomach and the presence of a palpable, thickened pylorus.

A patient seen by Cleveland[1] was a male child, healthy at birth but troubled with vomiting from the fourteenth day, and with constipation so marked that the bowels moved only about once a week. There was great emaciation. At two months of age there was well-marked peristalsis in the epigastrium from the left to the right, and a succussion splash could be elicited. No thickened pylorus could be felt. The diagnosis was made, but operation was refused. The child lived a month in this condition, developing one new symptom—repeated convulsions—thought from the mother's description to be due to tetany. After death the pylorus was found to be hard, three-quarters of an inch in length, and shaped like a bobbin with a constriction in the middle. The maximum circumference at either end was one and seven-eighths inches. The lumen admitted an instrument with a circumference of five-eighths inch. The mucous membrane in the pylorus lay in folds.

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[1] British Medical Journal, 1904, i. p. 1073.

McCaw and Campbell report a similar case in which operation was performed upon a male child somewhat more than two months old. The stomach was hypertrophied and dilated, and the pylorus, not palpable before operation, was found to be the "size of a walnut." It was incised longitudinally and sutured transversely, Halsted and Lembert sutures being employed. The vomiting continued, and in six days the child died. The suture line was in perfect condition, the pylorus readily admitted a lead-pencil, but when the stomach was distended with water *not a drop passed the pylorus,* which was obstructed by the redundancy of the mucous membrane, which fell in folds about the pyloric orifice.

Cautley[1] gives as the symptoms of congenital pyloric stenosis progressive wasting, vomiting unaccompanied by nausea and characteristic of pyloric obstruction, absence of bile from the vomit, constipation, clean tongue, sweet breath, a dilated stomach, visible peristalsis, and a palpable pylorus. This he has felt in the last 5 cases that he has seen. Four of these patients were operated upon with success. Cautley warns against the inference sometimes made after death as to the patency of the pylorus. This may be so firmly contracted by rigor mortis that no fluid can be squeezed through it, when fluid was passing in larger or smaller amounts up to the point of death.

LATE EFFECTS OF CONGENITAL PYLORIC STENOSIS. Maylard[2] says that gastric trouble in the adult is often a sequence of congenital narrowness of the pylorus. In support of this view he cites 7 cases in which the pyloric stenosis was verified by operation. All of these patients suffered from indigestion, gastric catarrh, and either occasional or permanent dilatation. The operation in each case was a gastrojejunostomy, and it was followed by a complete cure of the symptoms in 4 cases and marked improvement in the others. It is to be noted that the ease with which food passes the pylorus is dependent not only on the size of the canal but the rigidity of the sphincter. The article is illustrated by two diagrams (Figs. 5 and 6).

Hour-glass Stomach. Is an hour-glass stomach ever congenital? Brook[3] says that it is, mentioning a case within his own practice. A woman, aged fifty years, had suffered for years with indigestion relieved by vomiting. This symptom progressed until emaciation was extreme and operation was performed. The stomach was almost equally divided into two pouches by a narrow constriction. Gastroplasty was performed. The stomach, both outside and inside, appeared perfectly normal, and its wall at the site of constriction was as flexible and thin as at other points. Nor was there any sign of present or previous ulcer. No autopsy was obtained.

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[1] Lancet, 1904, i. p. 645.

[2] British Medical Journal, 1904, i. p. 416.

[3] British Medical Journal, 1904, i. p. 1073.

Effect of Non-perforating Traumatism. Monprofit[1] believes that not enough attention is given to traumatism as the cause of gastric disorders. He relates the case of a man who received a violent blow in the stomach and suffered for months afterward with repeated vomiting and other symptoms of gastric intolerance. He was greatly emaciated and presented a tumor of the epigastrium. Laparatomy was performed. There was a mass of inflammatory deposit around the pylorus and the remains of hemorrhage in the omentum, but no cancer. A posterior gastroenterostomy produced a complete cure.

FIG. 5.

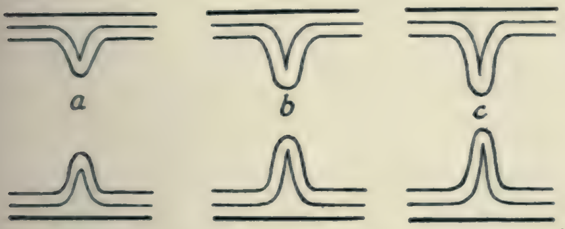

FIG. 6.

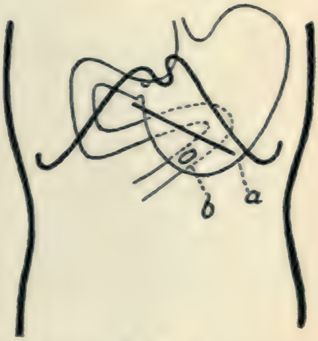

FIG. 5.—Diagrammatic longitudinal section of pylorus (natural size): *a*, normal diameter of pyloric orifice, 12 mm. to 15 mm.; *b*, *c*, abnormal diameters, 7 mm. and 3 mm.

FIG. 6.—Position of the parts after performance of a posterior gastrojejunostomy: *a*, skin incision; *b*, orifice of bimucous fistula, with union of gut above to under surface of stomach.

Gastric Cirrhosis. Sheldon[2] believes that there is such a condition as cirrhosis of the stomach marked by contraction of the organ, thickening of its walls, chronicity, vomiting, though not of blood; absence of a tumor on palpation, absence of glandular or hepatic involvement, and relief of the stomach symptoms when rectal feeding is resorted to. He cites from medical literature 10 cases described under various names, which he believes should properly be called cirrhosis of the stomach, and adds an eleventh from his own practice. The etiology of the disease is unknown. Only one of these patients was alcoholic. The treatment recommended is a gastroenterostomy, which was performed by Sheldon with complete success. If the stomach is not relieved surgically the fibrous induration progresses until the patient dies of inanition, with or without pyloric stenosis.

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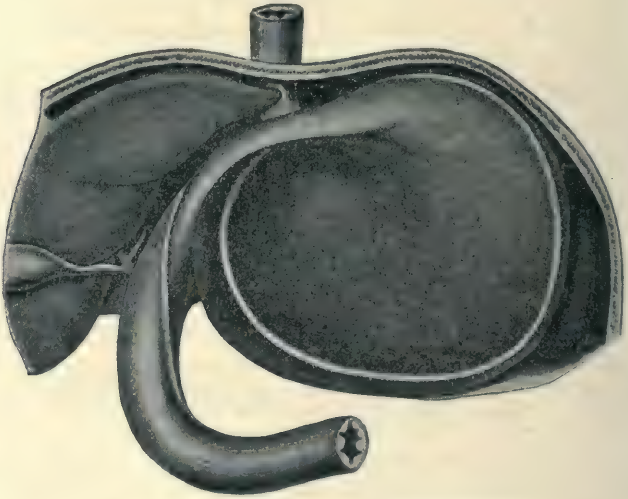
[1] Revue de Chirurgie, 1904, vol. xxx. p. 637.

[2] Annals of Surgery, 1904, vol. xxxix. p. 341.

Volvulus of the Stomach. Borchardt[1] reports a case of volvulus of the stomach occurring in a man, aged forty-four years, with a dilated stomach. Operation was performed, but the true nature of the difficulty was not recognized and the twist was not relieved. Fig. 7, made from a cast of the stomach after death, shows the manner of the volvulus. The omentum has been removed.

Borchardt gives the histories of 4 other cases of volvulus of the stomach previously reported. In all of these the colon was drawn upward nearly to the diaphragm, although in his case the colon was not disturbed. He says the diagnosis can be made in either type of volvulus, as soon as the abdomen is opened, by the fact that the congested stomach is covered with a thin membrane. This membrane is the large omentum in the infracolic type of volvulus, and the gastrocolic ligament in the supracolic type of volvulus. As stated, Borchardt lost his patient. In 3 of the other cases the nature of the lesion was recognized, and the stomach untwisted with the recovery of the patient.

FIG. 7.



Volvulus of the stomach (BORCHARDT.)

Foreign Bodies. Hair-casts of the stomach of animals and children have been sometimes reported,[2] but a cast of the stomach and duodenum is a novelty. Such a one, shown in Fig. 8, was successfully removed by

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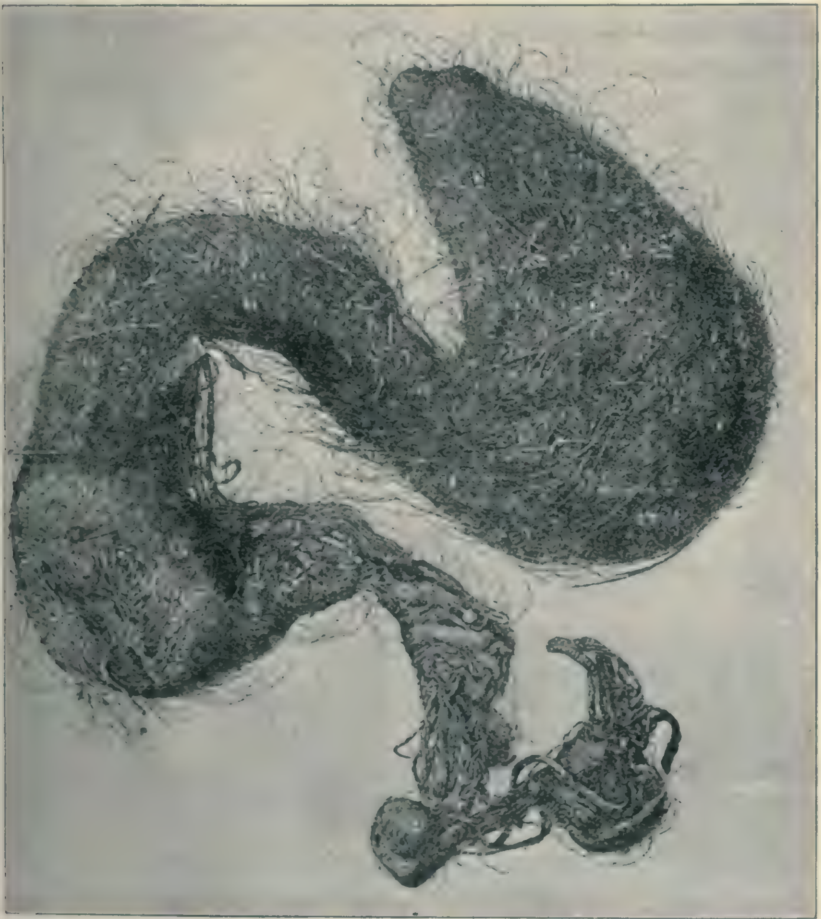
[1] Archiv klin. Chirurgie, 1904, vol. lxxiv. p. 243.

[2] PROGRESSIVE MEDICINE, June, 1902, p. 73

Ranzi.[1] The patient, a girl aged twenty years, gave the usual symptoms of loss of flesh, vomiting, constipation, and indefinite gastric tumor. Four years previous she suffered an acute attack of intestinal obstruction, relieved by the passage of a good-sized hair-ball, which had apparently broken off from the larger mass in the stomach.

FIG. 8.



Cast of stomach and two-thirds of duodenum made up of human hair, threads, and elastic bands. (RANZI.)

Gastric Ulcer. The decision to submit a patient with an uncomplicated gastric ulcer to surgical treatment must ultimately rest on the results obtained by surgical treatment as compared with those obtained by medical measures. Here are the opinions of a physician and a surgeon, respectively, who have looked up the late results of treatment:

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[1] Wiener klin. Wochenschrift, 1904, vol. xvii. p. 1342.

A Physician's Opinion. Russell[1] has succeeded in tracing the after-histories of 47 patients who were treated in the Birmingham General Hospital for gastric ulcer by medical means only. He found that no less than 45 per cent. were suffering with stomach symptoms of more or less severity at the time of report, one-third of them getting repeated and definite attacks with intervals of immunity, and two-thirds suffering from almost continual pain. There were besides a further 6 per cent. of the total number of patients discharged, of whom it could not yet be said whether they should or should not be added to the 45 per cent. of permanent sufferers. These figures, Russell says, afford some justification for the plea often made in favor of a more frequent resort to operative interference in persistent cases of gastric ulcer, always providing that the mortality of the operation can be kept at a really low figure, and that the results in cases operated upon can be shown to be permanently good. Further evidence on both of these points seems to him to be needed.

A Surgeon's Opinion. Moullin[2] gives an account of the after-life of patients operated on by him for gastric troubles, exclusive of perforation and carcinoma. He was able to trace 18 patients. Gastrotomy was performed upon 2 patients for vomiting, with pain or hemorrhage, but nothing abnormal was found. Their subsequent condition was about the same as before operation. In 8 patients gastrotomy revealed one or more ulcers which were treated by ligation (one excision and suture). One was improved only temporarily. All the others were permanently improved or entirely cured of the pain, vomiting, and hemorrhage. Two other patients suffering from ulcer were cured by gastroenterostomy. Two patients with pyloric stricture were cured by pyloroplasty, and one with perigastric adhesions was improved by this operation. Two with pyloric stricture were treated by gastroenterostomy; one was improved and the other cured. One patient was cured by drainage of a perigastric abscess.

Thus it will be seen that the results of operation for gross abnormalities were quite satisfactory. The number of cases is too small to show whether ligation or excision or gastroenterostomy is the best method of treatment for chronic ulcer. Undoubtedly the rest in bed and more careful diet are material factors in the improvement, whatever operation be selected.

Excision of the Ulcer or Gastroenterostomy. Maunsell[3] thus puts the case against excision of non-perforating ulcers of the stomach:

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[1] Lancet, 1904, vol. i. p. 288.

[2] British Medical Journal, 1904, i. p. 419.

[3] Dublin Journal of the Medical Sciences, 1904, vol. cxvii. p. 1.

1. It is not easy to locate the position of an ulcer at operation.

2. Ulcers are most commonly situated on the posterior wall and are hard to reach, more especially if the base is adherent to the pancreas, etc.

3. Ulcers are frequently multiple.

4. Ulcers are very frequent in the pyloric antrum and at the pylorus, where excision would lead to narrowing unless combined with pyloroplasty, which is not always advisable or readily performed.

5. The cause of the ulceration is in no way mitigated by the procedure, and the trouble may recur at a future date.

Gastroenterostomy is the safest and most satisfactory operation—all things considered.

Riedel[1] has published a critical review of 58 cases of ulcers of the stomach situated in its middle section—viz., in the lesser curvature, the anterior and posterior walls. The article is far too extensive for an abstract, so that we must content ourselves with the author's conclusions:

1. Ulcers in the middle section of the stomach are oftener multiple than single.

2. Those which begin in the lesser curvature usually extend in the form of a horseshoe to the anterior and posterior walls.

3. These ulcers are usually of a destructive character. They destroy the walls of the stomach not only in their depth, but also extend laterally and longitudinally, so that the cardia and pylorus are drawn much nearer together.

4. Stenoses of high degree are only seen when the greater curvature is involved in the ulceration.

5. As long as the ulcers are small and do not cause much formation of fibrous tissue they remain in the median line. The point of pain is then between the umbilicus and ensiform. Not all ulcers give rise to pain.

6. If the serosa in the neighborhood of the ulcer is much thickened, of if the ulcer has set up adhesions posteriorly with the pancreas or anteriorly with the left lobe of the liver, a large tumor may be felt.

7. Such a tumor mass moves almost invariably to the left as it has no place to rest on the front of the spinal column. There is gastric pain on the left side.

8. This left-sided pain is often sufficient for a probable diagnosis of gastric ulcer, even though no tumor can be felt, provided that there are present the usual symptoms of gastric disease, eructations, vomiting, etc.

9. Ulcers in the middle section of the stomach produce hæmatemesis in the minority of cases. Oftener they give rise to vomiting.

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[1] Archiv klin. Chirurgie, 1904, vol. lxxiv. p. 773.

10. The treatment in these cases should be at first dietetic and medicinal. An operation is to be regarded as a last resort.

11. Whenever possible operation should be performed before the ulcer has eaten its way into the pancreas or the left lobe of the liver.

12. The fewer the adhesions about the ulcer the easier is its wedge-shaped excision and the closure of the wound by suture; but this operation is only practicable when the loss of the gastric wall is small.

13. If the defect in the middle section of the gastric wall is greater, or if the ulcer has perforated into the pancreas or liver, transverse resection of the stomach is indicated.

14. The union of the cardiac and pyloric portions by Billroth's method is likely to succeed if the whole suture is through healthy gastric wall.

15. If the gap is very great it is better to close the pyloric incision by itself, and to unite the cardiac portion and the jejunum by a posterior anastomosis.

16. This procedure is absolutely necessary when the ulcer has involved the pylorus. The duodenum must then be closed.

17. Union of the cardiac and pyloric portions by suture without resection of the ulcer is an uncertain procedure.

18. Simple gastroenterostomy is also unreliable since the cardiac portion of the stomach is displaced to the left, so that the loop of jejunum which is used for anastomosis may be forcibly pulled upon.

19. If perforation of an ulcer results in subphrenic abscess, the left pleural cavity should be opened widely and the abscess drained through the diaphragm.

20. The operative results which Riedel has hitherto obtained in this class of cases are unsatisfactory. Better results may be obtained by an early diagnosis and a relatively early operation, for the stomach is an organ which offers favorable conditions for successful suture.

Stevens[1] reports an operation upon a patient who had suffered from pyloric stenosis and gastric dilatation for twenty-one years. The pylorus was a hard, gristly mass, but gave no evidence of malignant disease, nor were there any adhesions to the gall-bladder or any other viscus. A posterior gastroenterostomy was performed. This relieved the patient of his symptoms, and at the time of report he was enjoying his food and gaining weight.

PERFORATING GASTRIC ULCER. Operation for perforating gastric ulcer has become so common that the report of individual cases ordinarily excites no comment, but when 9 consecutive cases with 8 recoveries are presented from a single hospital, it is worth while to inquire regarding the treatment. The patients were treated by Turner and English[2] in St. George's Hospital, London.

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[1] Lancet, 1904, i. p. 935.

[2] Lancet, 1904, vol. ii p. 145.

All of Turner's 7 cases, with the exception of a leaking subphrenic abscess (Case VII.) were treated in the same way. The ulcers when found were first of all sutured as rapidly as possible without paying undue attention to the non-inclusion of the mucous membrane or carrying the suture for any distance beyond the limits of the perforation. In nearly all the suture was subsequently strengthened by a few Lembert stitches. Each case, except the one referred to above, was treated by free irrigation, warm sterilized water or weak boric lotion being used, *after* provision had been made for drainage, not only at the seat of the wound but in the suprapubic region and the flanks, and this irrigation was continued until the outflowing fluid was absolutely clear. The peritoneal cavity has been irrigated in this way by as much as fourteen or sixteen pints. Irrigation was designedly omitted in Case VII. (leaking subphrenic abscess); the contaminated parts, however, were cleaned by simple sponging. Irrigation, where there is any localized collection of foul septic pus, on account of the danger of dissemination is not to be recommended.

Drainage-tubes as large as the middle finger (usually three in number) were inserted; (1) above the pubes, (2) down to the seat of the ulcer, and (3) in one or both kidney pouches. In the case where the appendix was the seat of a fecal concretion and was removed, a drainage-tube was passed through the right linea semilunaris. In nearly all the cases the suprapubic drainage disclosed a pelvic collection of peritoneal fluid and stomach contents.

Only one of the perforations was not sutured; that one was on the posterior surface of the stomach close to the œsophageal end, in the immediate neighborhood of the aorta; the anatomy of the surrounding parts was much obscured by adhesions and inflammatory changes, and it was deemed safer to treat the case by gauze packing.

It is not claimed that the subsequent drainage had much to do with the success of these cases, but the incisions made for this purpose undoubtedly allow at the time of the operation a complete and thorough searching out of any little peritoneal pouch or pocket that might otherwise escape irrigation and thus largely contribute to the eventual recovery of the patients. The one patient who died had come a long way from the country and was practically moribund at the time of the operation. All the 8 cases in which there was any chance of recovery got well.

English's cases (VIII. and IX.) were treated in the same way with the trifling exception that an omental graft was used to help to close the perforation.

These surgeons were fortunate in seeing their patients early. Four of the operations were performed in twelve hours or less after perforation, three others in less than twenty-four hours. In the remaining two the interval between perforation and operation was two days. One of these patients died. The one who recovered was a very anæmic girl with an admission temperature of 103° and pulse of 140. The abdomen was very tender all over, especially in the left hypochondrium. It was slightly rigid but not much distended; there was fair movement on respiration; splashing sounds were heard. Tubular breathing and dulness were present over the lower part of the left lung.

A median epigastric incision was made. There were much straw-colored fluid and free gas in the peritoneal cavity. A small perforation was found near the œsophageal end of the stomach on the posterior surface close to the aorta; there were many adhesions around it. Gauze packing was passed to the perforation. A second opening was made in the hypogastrium; much foul fluid was sponged out, with general irrigation with weak boric lotion. Drainage-tubes were passed into the pelvis and into each flank. There was much bronchitis during the week after operation; thrombosis occurred in the left calf during the third week. The patient was discharged from the hospital on the thirty-second day.

A recovery after operation performed as late as this is the more remarkable in that adhesions do not seem to have limited the escaped fluid to a small part of the peritoneal cavity.

Wood[1] operated fifty-two hours after the occurrence of perforation in the stomach of a man aged twenty-five years, and succeeded in saving his patient. This is unusual after so long an interval when the perforation is into the free peritoneal cavity. During this interval there was more or less pain, gradually increasing intestinal stasis, and accompanying distention, but only a little fever and rise of pulse. At the operation the pulse was 96 and the temperature 101°. The perforation was minute, near the pylorus, and the parts were so bound down by adhesions that suture was almost impossible. It was therefore abandoned and a cyanide gauze wick was introduced leading to the perforation. Through a right lumbar incision and a suprapubic incision the purulent fluid in the general abdomen and pelvis was washed away.

Blake[2] says that the most important advance in the treatment in perforated gastric ulcer has been the establishment of the fact that early operation is absolutely necessary for the attainment of good results. To wait for the shock to disappear is simply to invite failure. The shock of a perforation is caused by irritation of the peritoneum, and disappears with the administration of the anæsthetic. He reports six patients operated upon, with three deaths. No patient died who came to operation within twenty hours of the perforation. Blake's method of treatment is given on another page under the title "General Peritonitis."

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[1] Lancet, 1904, ii. p. 1563.

[2] American Journal of the Medical Sciences, 1904, vol. cxxviii. p. 985.

Maunsell[1] states that "The perforation should be closed by a double row of continuous sutures and the peritoneum should be cleansed with gauze swabs and plenty of warm, normal saline solution. The chief error is made in striving to do without free flushing and in resting satisfied with mopping up the small amount of fluid seen immediately in the operation area without making a rapid but systematic search through the whole cavity. I venture to state that there are very few cases of perforation in which the pelvis is not full of fluid, and in which a hand passed above and behind the spleen on the left and above and behind the liver on the right will not bring from these treacherous pockets sufficient morbid material to reward the operator for his search." Maunsell advises against evisceration for purposes of cleansing, but recommends incision and deflation of the much-distended stomach and intestines. Gastroenterostomy is recommended if the ulcer is situated near the pylorus, or if the pylorus is constricted.

White[2] is an advocate of excision and suture in cases of perforated gastric ulcer. He reports 5 cases with 3 recoveries, and remarks: "The fact that 2 of the 5 cases died long (two weeks and six weeks) after recovery from the immediate effects of the perforation is disappointing, and is evidence of how formidable the sequelæ to the condition may be. In both cases the fatal result was the outcome of ulceration of the mucous membrane along the line of suture. . . . Where the ulcer is easily accessible its excision, together with the surrounding indurated and thickened tissue, secures a far better closure of the perforation than merely bringing together the peritoneal surfaces, and with the use of the continuous suture takes up very little additional time."

It is difficult to understand how a man can write the three sentences above quoted without observing their inconsistency. He lost two patients from a suture in diseased tissue—one dying from infection and the other from secondary hemorrhage—and yet recommends a method of operation the success of which necessarily depend upon the power of healing of the gastric wall in the close vicinity of a spontaneous necrosis of that wall. Were excision necessary this risk could not be avoided, but scores of recorded cures by suture alone show that the more heroic excision formerly advocated by many surgeons is in most cases unjustifiable.

Perforated Ulcer or Appendicitis? A perforated gastric or duodenal ulcer has more than once been mistaken for appendicitis.

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[1] Dublin Journal of the Medical Sciences, 1904, vol cxvii. p. 1.

[2] British Medical Journal, 1904, i. 421.

The symptoms are often so similar that no one need be ashamed of this error; but once the abdomen has been opened and the signs of perforative peritonitis discovered, the surgeon should not be turned from the true source of the infection by the discovery of a more or less inflamed appendix *which has not perforated.* It is even a serious question whether he should prolong the operation by the removal of such an appendix. The following four histories are well worth perusal:

A boy aged thirteen years complained of abdominal pain and was put to bed with a hot-water bottle applied to the abdomen. In the morning he felt better but his stomach was still sore. He ate a good dinner, and an hour later was seized with violent abdominal pain, followed by collapse and rigid abdomen. About nine hours after the attack the abdomen was opened by Cheyne[1] in the appendical region. On exposing the peritoneum it at once bulged out in the wound and on puncturing it gas whistled out. On enlarging the opening the small intestines were forced out, partly by the gas and partly as the result of the great rigidity of the abdominal walls, which had not become relaxed under the anæsthetic. Some thin, whitish fluid also came out of the abdomen. For the most part the intestines were normal in appearance, but on some of the coils of the small intestine, which came apparently from the left side of the abdomen, there were some flakes of lymph. The pelvis and lower part of the abdomen were well irrigated with salt solution till the fluid returned clear, and the intestines were then, gradually but with considerable difficulty, returned to the abdominal cavity. The cæcum and appendix were next pulled out. The appendix was long, thickened, a good deal reddened, and contained a large concretion; but there was no perforation of the appendix nor of the cæcum in the neighborhood. The appendix was removed in the usual manner.

As it was evident that there must be some graver lesion than the condition of the appendix to account for the state of matters, and as practically the whole of the small intestine had been seen, and as also there was no fecal material present in the abdominal cavity, a second incision was made over the stomach. An opening was found near the cardiac end from which gas and gastric contents were escaping. It was sutured. The abdomen was irrigated and drained. The patient recovered.

A girl aged seventeen years complained for four days of indefinite epigastric pain, followed by sudden intense pain, worse in the lower abdomen and right side, with vomiting and collapse. Low[2] made a diagnosis of peritonitis probably from the appendix.

The abdomen was opened by an incision over the appendix, giving exit to a quantity of non-odorous purulent fluid containing flakes of lymph. The coils of small intestine were seen to be intensely congested and lightly glued together by sticky lymph. The appendix was found to be four inches in length, rigid with thickened walls, while its lumen contained two concretions. Its peritoneal coat was intensely injected in common with the rest of the peritoneum. It was removed in the usual manner, but though obviously in a condition of acute inflammation there was no perforation or area of necrosis and it was not therefore considered to be the cause of the general peritoneal infection present. The two ovaries and tubes were examined and found to be intensely congested as part of the general peritonitis of which, however, they did not appear to be the origin.

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[1] Lancet, 1904, i. p. 1641.

[2] Ibid., i. p. 1789.

A median incision was then made above the umbilicus and it was at once seen that the peritonitis above the line of the transverse colon was of older date, judging by the amount of lymph and adhesions, than the inflammation in the lower part of the sac. After some difficulty a perforation was found in the middle of an indurated area the size of a five-shilling piece, situated beneath the left lobe of the liver on the anterior aspect of the small curvature of the stomach and close to the cardiac end. This was invaginated and the edges were brought together by two layers of fine silk sutures. The abdomen was then carefully flushed out with hot saline solution and sponged nearly dry and drained. The patient recovered.

The third case is somewhat different. The appendix was not seen but the presence of a localized abscess in its vicinity seemed to warrant the diagnosis of appendicitis. The subsequent history of the case proved the mistake in diagnosis, and the gastric perforation was finally recognized but not soon enough to save the patient. The operator was Milward.[1]

The patient was a female, aged seven years. She had been ill at home for fourteen days. On admission there were tenderness and slight bulging in the right iliac fossa, and general distention of the abdomen. An incision was made over the appendix and two ounces of pus were evacuated. The abscess cavity was outside the cæcum and was densely walled round by adhesions, the abdominal cavity being apparently quite shut off. The appendix was not found. From this time until she died, thirty days later, the wound showed not the slightest tendency to heal. The bowels were confined for the first five days, then she had diarrhœa for three days, and afterward intermittent diarrhœa and constipation. Eight days after admission a slight swelling, which was tympanitic on percussion, appeared in the epigastrium. This very slowly increased in size but varied considerably with the state of the bowels, being more tympanitic and larger during constipation. It was thought to be the distended colon. On the twenty-fifth day the swelling so increased that the epigastrium was incised, opening a cavity over the stomach, containing gas and very little pus and lymph. This cavity was also densely shut off from the general peritoneal cavity by adhesion of the periphery of the stomach to the anterior abdominal wall. On the following day gastric contents were found in the cavity as well as a perforation of the anterior wall of the stomach of the size of a three-penny piece. An attempt was made to suture the perforation but was hardly successful owing to the adhesions preventing the margins coming together.

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[1] Lancet, 1904, ii. p. 761.

In the fourth case the diagnosis was still more difficult, since the ulcer, which was of the duodenum, had not perforated, and there was consequently no peritonitis. The patient, a man aged fifty-six years, had suffered from at least two attacks of pain in the region of the appendix, so that an operation was decided upon by Lediard.[1] There was also a small umbilical hernia.

On opening the peritoneal cavity the omentum was found to be adherent to the umbilical ring. This was freed without much difficulty. The appendix was found lying behind the cæcum and was sharply "kinked." It presented no signs of acute inflammation but was broader in diameter than normal and its surface showed old lymphoid deposit. It was removed, and after careful treatment and ligation of the stump the great omentum was pulled down over the intestines and the abdominal incision was closed. A mural abscess developed, but healed promptly after drainage.

On the fifth day after operation compound licorice powders were given to open the bowels. Two tarry stools were passed containing blood. On the eighth day after operation the stools again contained much tarry-looking blood, and on the eighteenth day the blood was still more copious in amount. Up to this time the patient looked and felt fairly well, his temperature was fairly regular, and his pulse never above 80. On the nineteenth day his pulse became a little intermittent and the fact of his having lost a large quantity of blood now began to be obvious in the pallor of his skin and the pearliness of his mucous membranes. Opium was exhibited for eight days, during which time his bowels were confined. The source of the hemorrhage was much debated; it was obvious from the extreme alteration of the blood that its source was high up in the intestinal tract, and hepatic cirrhosis, gastric ulcer, and carcinoma were considered, but all were dismissed for want of evidence.

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[1] Lancet, 1904, ii. p. 761

On the twenty-eighth day an enema brought away melænal stools. An enema on the thirty-first brought away lighter-colored stools, and enemata on June 2d, 4th, 6th, and 7th produced normal colored stools. About this date it was suggested that the hemorrhage was due to a duodenal ulcer consequent on the breaking down of the skin incision, the process being akin to that following burns. Whatever the cause, a little hæmatemesis on the 14th was again followed by melænal stools on the 15th, 16th, and 17th, and the patient succumbed on the 20th from exhaustion, despite every variety of medicinal styptic treatment.

At autopsy there was found an ulcer of the second portion of the duodenum, in the base of which there was an eroded pancreatic artery. A section through the margin of the ulcer with the attached pancreas showed that the floor of the ulcer was formed by the thickened capsule of the pancreas, the walls of the intestine being completely destroyed.

HEMORRHAGE FROM A DUODENAL ULCER. An experience by Allingham[1] shows the benefit to be derived from a *gastroenterostomy* under such circumstances. The patient was a man, aged forty-two years, who suffered for some years with hæmatemesis and tarry stools. There was gastric dilatation. Pain was never a prominent symptom. One evening while lying quietly in bed he was seized with an attack of severe pain, extending from the hepatic region to the right groin and testicle A diagnosis of perforation of a gastric or duodenal ulcer was made, and operation performed in a few hours. The peritoneal cavity was full of escaped intestinal contents. The perforation was two inches below the pylorus. It was sutured and the peritoneal cavity flushed and wiped, and the abdomen refilled with sterilized water in the hope of diluting any residue of intestinal discharge. The patient did well and liquid feeding by mouth was begun on the fourth day and increased very cautiously. Two weeks after operation, and again at four weeks, there was vomiting of blood and blood in the stools. This last attack was so severe that life was despaired of, but the patient again rallied. One week later, when his strength permitted, gastroenterostomy was performed. The duodenum at the site of the ulcer was quite shut off by adhesions, and could not be seen. The patient recovered completely without further hemorrhage.

Gastric Cancer. SYMPTOMS OF GASTRIC CANCER. Perry and Shaw[2] have published a very full report of 306 fatal cases of carcinoma of the stomach treated in Guy's Hospital from 1826 to 1900 which contains much that is interesting to the surgeon. The proportion of males to females was about 5 to 2. The youngest male was fifteen years, the youngest female eighteen years, and the oldest of the two sexes seventy-one years and eighty-one years of age. The average duration of the illness according to the histories taken was about nine months, from the onset of symptoms until death.

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[1] Lancet, 1904, ii. p. 888.

[2] Guy's Hospital Report, 1904, vol. lviii. p. 121.

In 13 cases the extension of the growth and ulceration produced perforation of the wall of the stomach and acute peritonitis. There were 7 other cases of perforation in which only a localized abscess was caused. Perforation is not likely to occur early in the disease. The average duration of life from the beginning of the disease in these 20 cases was over eleven months. The histories of these patients show that perforation was generally not accompanied by any marked symptoms. In only 6 of them was there any symptom which might have aroused suspicion of perforation, and it does not appear that in a single instance the diagnosis was made during life. This is in striking contrast to the violent symptoms which usually follow perforation of gastric ulcer. It simply means that in gastric carcinoma the perforation takes place at a time when the patient is already moribund and the peritoneum is incapable of resenting the presence of foreign material.

TREATMENT OF GASTRIC CANCER. Nordmann[1] contributes an article based on the clinical histories of 126 patients treated in Körte's clinic for tumors of the stomach. Most of these tumors were carcinomata, but 2 of the 38 which were resected were found to be other than carcinoma—viz., 1 sarcoma and 1 due to tuberculosis. These last two tumors were both of the pylorus and were both palpable before operation.

While this article does not contain much that is new, there are points in it worth notice. In only about one-fourth of the cases was the patient's condition such as to render removal of the tumor feasible. This is a sad commentary on our diagnosis of gastric diseases. In more than one-half of the cases gastroenterostomy was performed. This was the palliative operation of choice. In a few instances a fistula was established leading to the stomach or jejunum, and in some others nothing more than an exploration was attempted.

All of the patients when first seen were distinctly cachectic. Some of them dated their illness years back, others said they had symptoms for only a few weeks. Nordmann explains this by saying that cancer of the stomach does not give the patient severe symptoms until it produces stenosis of the pylorus. Vomiting, loss of flesh, and constipation, were the symptoms complained of in almost every instance.

Only 11 of the 38 patients upon whom resection of the tumor was performed had complained of pain in the stomach. This pain was sometimes distinctly of a colicky character, and was due apparently to adhesions with the neighboring organs, gall-bladder, pancreas, etc., or to the ineffectual efforts of the stomach to force its contents through the constricted pylorus.

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[1] Archiv klin. Chirurgie, 1904, vol. lxxiii. pp. 536, 873

Czerny once said that a palpable cancer of the stomach is too advanced for removal. This did not prove to be the case in Körte's clinic, for a tumor was palpable in 34 of the 38 cases of resection. In one-half of these cases, however, there was only a painful sense of resistance or pressure. This was found on operation to be due in most instances to adhesions with the neighboring organs.

Lactic acid was present in two-thirds of the cases in which this test was employed for diagnosis. This is a late symptom and is due to the fermentation of retained food. *Hydrochloric acid* was absent in 90 per cent. of the cases tested. Unfortunately this symptom, which is one of the best diagnostic points known, does not always appear until rather a late period.

In making a resection Nordmann believes that the sense of touch is the most reliable guide to the limits of the tumor. Retroperitoneal glands were removed by opening into the lesser peritoneal cavity before opening the stomach. If enlarged glands were present in the omentum resection was not attempted. No one method of operating was practised exclusively, but different methods were followed, according to the condition of the exposed organs. The mortality of these various resections was 42 per cent. Of the patients who survived resection 13 died in from one to five years, and 9 were living at the time of report at from one to five years after operation. One of the above-mentioned 13 patients died of cancer of the liver more than four years after the tumor was resected from the stomach. One ought, therefore, to be very cautious in claiming freedom from recurrence after resection of the stomach for carcinoma.

Some have minimized the advantage of palliative operations in advanced carcinoma of the stomach, partly in view of the high mortality attending this operation in such patients, and partly because of their short expectation of life. The statistics of the 67 patients in this series upon whom this operation was performed give ground for a more optimistic view. The mortality from operation was not quite 20 per cent., while the patients who recovered from the gastroenterostomy were for the most part relieved of their most distressing symptoms and lived some weeks or months, with little or no vomiting. Such a patient is in a much better condition than one who has had a jejunostomy performed for carcinoma of the pylorus.

Preference was given to the retrocolic posterior method, advocated by von Hacker and often called by his name. No button was used in performing this or the anterior operations. The suture, a double one, was essentially that described by Moynihan, page 63, this number of Progressive Medicine. Suture of the stomach in the rent made in the mesocolon seemed to prevent any regurgitation of bile into the stomach, although in ten of the operations an enteroenterostomy was performed to make sure of the proper flow of bile into the intestine. The mortality in the 45 cases in which the posterior operation was employed was 15.5 per cent.

A Physician's View of the Surgical Treatment of Pyloric Cancer. Steven[1] believes that in the present state of our diagnosis *pylorectomy* for gastric cancer can rarely be undertaken with much chance of success. The mere removal of a considerable portion of the stomach seems more of a shock than most such patients can stand. He gives brief histories of 13 patients treated by him, whom he turned over to the surgeons for operation, with the following results;

Pylorectomy advised but found to be impossible	1 case	(recovery).
Gastroenterostomy advised but pylorectomy performed, as the conditions seemed favorable when the abdomen was opened	2 cases	(both died).
Exploratory operation advised and followed by—		
(*a*) Gastroenterostomy	6 "	(5 recovered).
(*b*) Closing of the wound, as nothing could be done	4 "	(3 recovered).

This table shows how well these patients bear an exploratory operation, so that one should not hesitate to advise it, to be followed by gastroenterostomy in all cases in which pain on the passage of food or vomiting show that the pylorus is obstructed. From his previous experience Steven is not inclined to advise pylorectomy in any case, unless the patient, fully aware of its great risk, prefers the slight chance it offers of a radical cure.

Resection for Gastric Cancer. Rydygier[2] advocates resection of the pylorus for carcinoma in two steps. At the first operation the stomach is cut across above the tumor, sutured, and a V-gastroenterostomy performed. Besides this a rubber tube is sutured into the pyloric portion of the stomach and brought out of the wound. This tube passes through the pylorus and well into the duodenum. Through it the patient can be fed until the second operation, if necessary, thus ensuring rest to the gastric suture while not depriving the patient of much needed nourishment. At the second operation the pyloric remnant of the stomach and a little of the duodenum are excised, and the duodenum is sutured. In this manner the risk to the patient is said to be less and the most thorough removal of the tumors is secured.

Resection. According to Kocher[3] the percentage of recoveries following resection of the stomach for carcinoma is constantly improving.

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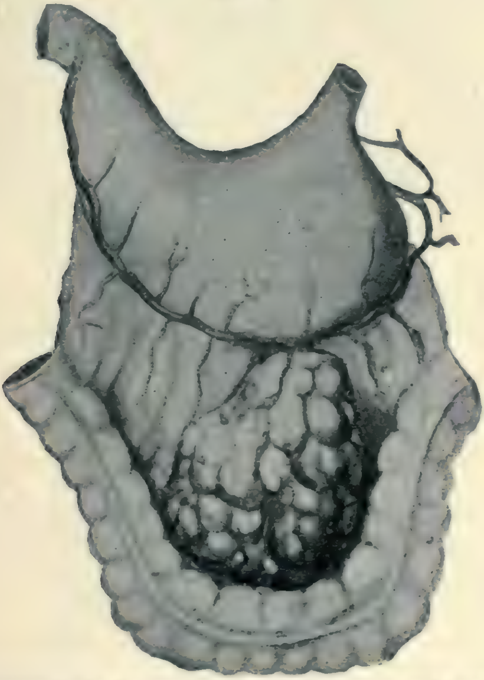
[1] Lancet, 1904, i. p. 1487.

[2] La Semaine Médicale, 1904, p. 332.

[3] Centralbl. f. Chir., 1904, p. 1315.

He reports 45 cases of partial resection performed by him since 1898, with a mortality of only 17 per cent. as compared to 44 per cent in 52 previous operations of this character, while the strictly operative mortality of these 45 operations is really only 5 per cent., 1 patient dying of perforation and 1 of gangrene of the colon. The other deaths were due to pulmonary conditions existing previous to operation. Twenty of these 97 patients were living at the time of report, 10 of them having survived operation for more than two years.

FIG. 9.



Shows diagrammatically the appearance of the tumor and its relation to the stomach and colon.

Sarcoma of the Stomach. While medical literature contains numerous articles on gastric carcinoma, sarcoma is seldom spoken of. This is due in part to its greater rarity and in part to the fact that the connective-tissue tumors either do not originate in the orifices of the stomach, or, if they do so, they do not produce constriction. Hence they may grow for a long time without obstructing the passage of food. Alessandri[1] describes a case of pedicled sarcoma of the stomach occurring in a woman aged fifty-six years. For four years she suffered from remittent fever, and about one month before coming under his observation she noticed an increase in the size of the abdomen. There was constipation but no disturbance of gastric digestion. Examination showed a rounded tumor in the left upper quadrant of the abdomen—movable in all directions, but least to the right and downward. It was not tender on pressure. Distention of the stomach with air caused it to cover the upper portion of the tumor. Distention of the colon showed it to lie along the lower border of the tumor. The spleen could not be outlined.

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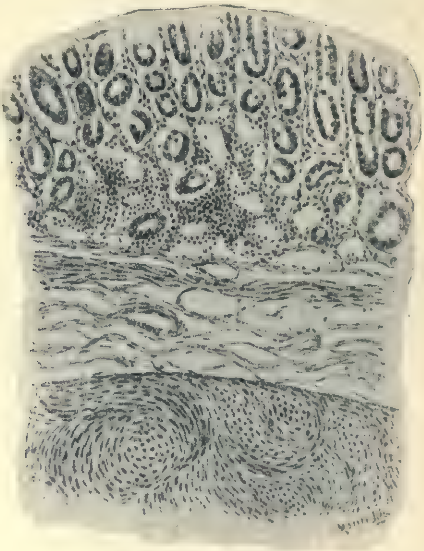
[1] Mitt. aus der Grenzgeb. der Med. und Chir., 1903, vol xii. p. 455.

At operation the tumor was found to be embedded in the layers of the gastrocolic ligament, and to be connected with the stomach by a pedicle of less than an inch in diameter. It was removed together with the portion of the gastric wall to which it was attached. The patient did well for a few days but died without fever on the thirteenth day. The wounds in the stomach and abdominal wall were perfectly healed and the cause of death was not apparent (Fig. 9).

Fig. 10.

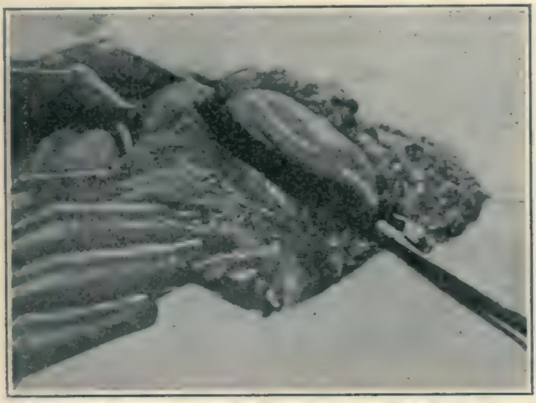


Microscopically the tumor was a spindle-celled sarcoma. Its relation to the stomach is shown in the drawing of a section through the base of the pedicle (Fig. 10).

Alessandri describes briefly 19 other cases of primary sarcoma and mixed tumors of the stomach which he found recorded in literature. Some of these were pedicled like the tumor in his own case; some were diffuse; some of these tumors were discovered at autopsy. In other cases the diagnosis was made during life and operation performed. Four patients recovered. In 4 cases a fatal outcome was reported.

Technique of Gastroenterostomy and Enteroanastomosis. Moynihan[1] performs posterior gastroenterostomy by suture in the following simple manner:

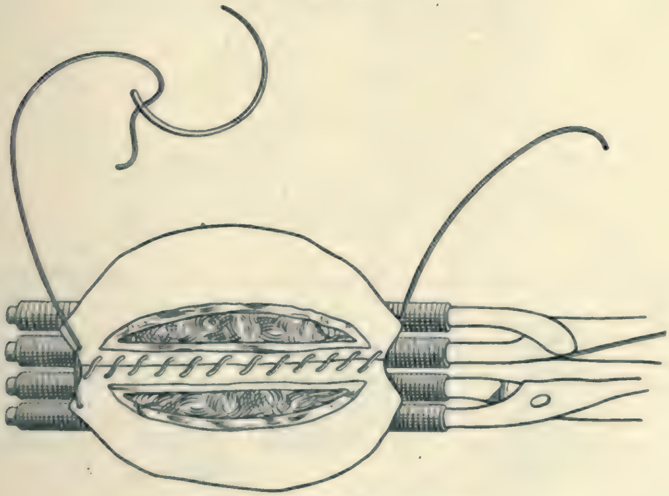
FIG. 11



Clamps applied obliquely to the wall of the stomach, which is drawn through a vent in the mesocolon.

The abdomen is opened by splitting the fibres of the right rectus. The under surface of the transverse mesocolon is exposed and torn through at the bloodless spot. The posterior wall of the stomach is drawn through this opening and seized with long clamps covered with rubber tubing (Fig. 11). The clamps extend from the lowest part of the greater

FIG. 12.



Beginning of serous suture.

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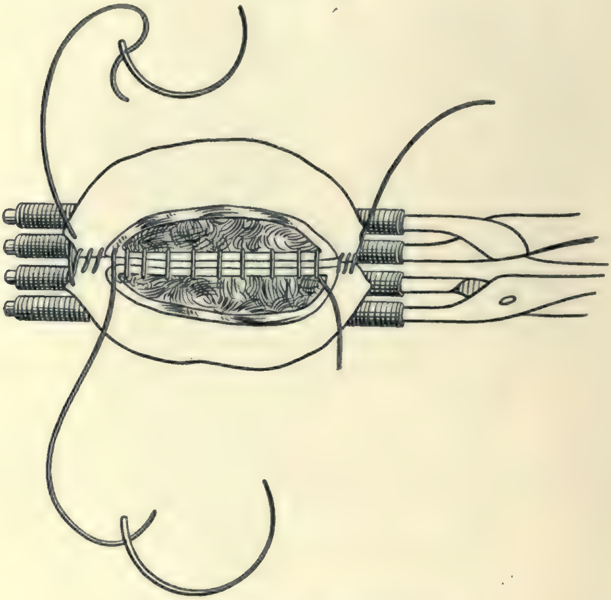
[1] Practitioner, 1904, vol. xix. p. 251.

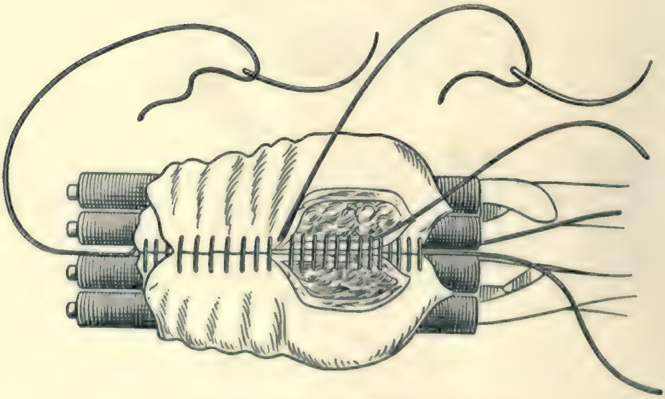
curvature obliquely across the stomach, more toward the cardiac than the pyloric orifice. The jejunum is brought to the surface and clamped longitudinally about seven inches from its origin. The two clamps are laid side by side and the continuous serous suture is inserted (Fig. 12) for two or three inches. The stomach and jejunum are incised in front of this suture for a distance of about two inches and an ellipse of the

Fig. 13.



Inner suture half completed

Fig. 14.

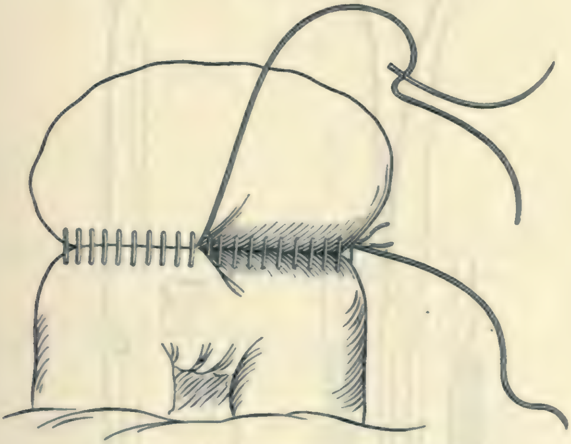


Inner suture three-quarters completed.

pouting mucous membrane is excised. The inner suture in then inserted through all the coats of the stomach and intestine (Figs. 13 and 14) beginning at one end of the incision and carried all the way around to the starting point. It is drawn tight and tied and the clamps are removed. If there is any hemorrhage or any weak spot, an interrupted suture may be inserted. The serous suture is then resumed (Fig. 15). The gut is then wiped with a swab wet in salt solution. Moynihan uses fine Pagenstecher thread and half-curved needles.

The natural place for an anastomosis between the stomach and jejunum is at their point of contact. In performing *antecolic gastrojejunostomy* it is necessary to leave sufficient slack between the duodenum and the point of anastomosis to surround easily the colon. In *retrocolic gastrojejunostomy* such slack is not needed—is, in fact, a disadvantage. Scudder prefers anastomosis by two continuous sutures, one introduced from the mucous surfaces, one from the serous surfaces.

FIG. 15.



Serous suture three-quarters completed.

An English surgeon, Anderson,[1] insists on the following points as essential to success: (1) the site of junction—namely, the posterior aspect of the stomach as opposed to the anterior whenever possible and in but few cases is it impossible to effect a posterior junction; (2) shortness of the loop of bowel as measured from the duodenojejunal angle; (3) the obliquity of the incision into the stomach—namely, from below upward; (4) approximation as near as possible to the greater curvature; (5) removal of superfluous gastric and intestinal mucous membrane; and (6) immediate suturing with fine silk by an inner and outer layer together, with the use of clamps during the process of suturing. In the after-treatment he lays special stress upon the importance of pillowing the patient up in a semirecumbent position as soon as the anæsthetic sickness has passed off, and the wisdom of early judicious feeding.

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[1] Lancet, 1904, ii. p. 585

A case related by Barker[1] emphasizes the importance of the short jejunal loop. He performed posterior retrocolic gastrojejunostomy for gastric ulcer. The patient recovered perfectly and married and became pregnant. At the fifth month of her pregnancy, about two years after the operation, the intestines became obstructed. She promptly called her surgeon, who opened the abdomen and found the whole mass of small intestine had twisted from the patient's left to right. When this twist was relieved it was further seen that the whole small intestine

Fig. 16.

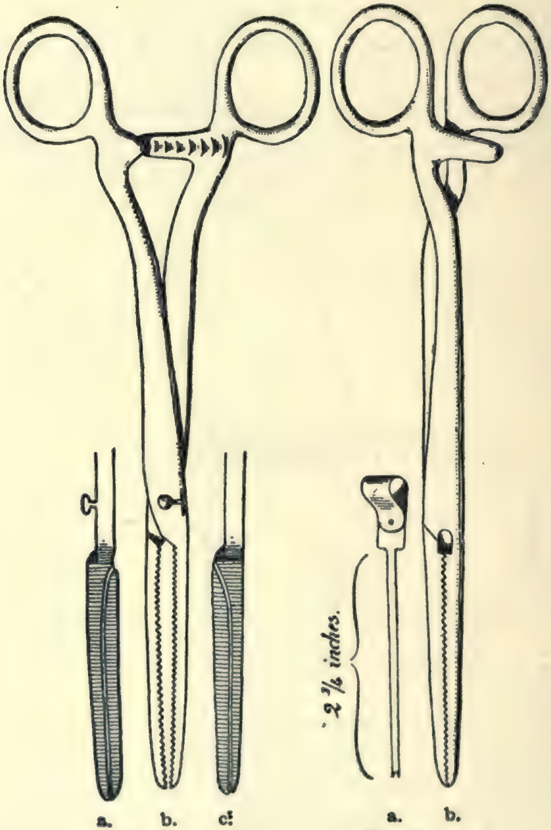

Fig. 1. Fig. 2.

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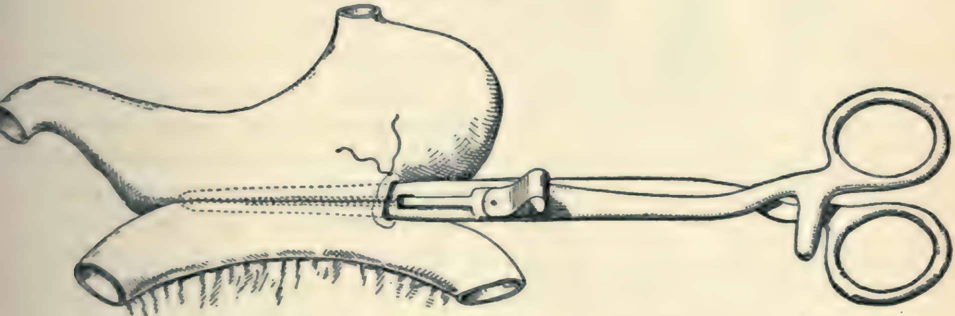
[1] Lancet, 1904, ii. p. 1277

had passed from below upward behind the anastomosed jejunal loop, and passing over it had formed the volvulus in front of it.

Gilbert[1] suggests a rapid method of performing gastroenterostomy or enteroenterostomy by a single continuous serous suture. A longitudinal groove is cut in each blade of a long straight pair of Pean's elastic forceps. These two grooves form a bore from end to end of the blades when the forceps are closed. Through this bore a special fine knife can be passed. A small opening is made in stomach and jejunum at one end of the future anastomosis, the forceps are passed and closed, fixing the two walls in apposition. A continuous suture is applied—an easy procedure, as the forceps act as a handle to present the parts for suture. When the suture is everywhere complete except at the handles of the forceps, the knife is passed through the bore of the forceps, cutting both stomach and jejunum the required distance. The forceps are unclamped and withdrawn, and the remaining gap is sutured. The escape of gastric and intestinal contents is prevented, and there is a minimum handling of the parts.

FIG. 17.



Werelius[2] accomplishes this intraintestinal division of the walls by means of a silver wire or stout thread inserted as in Fig. 18, when the seroserous suture is half-completed. When the suture is finished all but one stitch, the wire is made to cut its way out by sawing, pulling on its ends alternately while an assistant holds the parts firmly. This has been tested upon animals.

Sato[3] suggests a method of anastomosis of stomach or intestine without opening the lumen. The serous and muscular coats are dissected away for an appropriate distance, and then a smaller area of mucous membrane is cauterized with nitrate of silver. The excess of caustic is wiped away and the two portions of intestine are sutured. Numerous experiments on animals showed that mucous membrane so treated necroses within twenty-four hours. The advantages urged for this method are protection of the peritoneal cavity from infection, the ease with which anastomosis is performed, even without an assistant, if necessary, and the fact that no previous preparation of the bowel by cathartics, etc., is necessary, as the lumen is not opened until the serous surfaces have become firmly attached.

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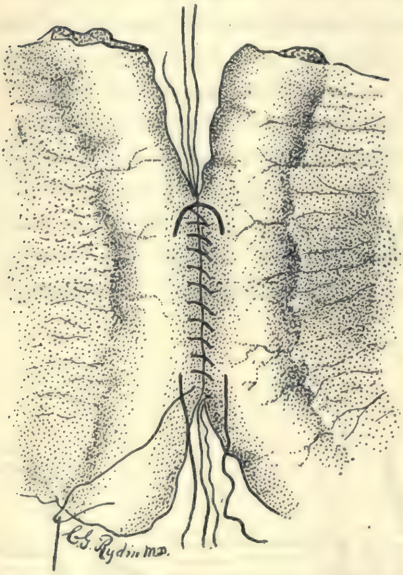
[1] Medical Record, 1904, vol. lxvi. p. 957.

[2] Journal of the American Medical Association, 1904, vol. xliii. p. 1230.

[3] Wiener klin. Wochenschrift, 1904, No. 7.

FIG. 18.



Maury,[1] whose experiments with the *elastic ligature* were reported fully in PROGRESSIVE MEDICINE, June, 1904, announces that he has found twine superior to rubber for this purpose. Any strong twine will answer, perhaps a fish line is as good as any other. It can be sterilized by boiling, it does not deteriorate with age as does the elastic, and it is easier to introduce than the elastic. He now recommends a triangular stitch instead of the quadrilateral previously described, for it can be introduced more rapidly, and experiments show that it punches out a good-sized opening.

Harrington[2] describes a *segmented ring* which he has invented to facilitate intestinal anastomosis, and reports 9 anastomoses between different portions of the alimentary tract performed with the aid of the ring; also 22 experiments upon animals. The ring is made in four segments, held together by a fine rod until the suture is complete.

Gasset[3] who tested upon the cadaver the suggestion of Biondi to unite the *œsophagus and stomach* through the pleural cavity and through the diaphragm, believes that three operations are anatomically possible: (1) a lateral anastomosis between the œsophagus and the stomach; (2) implantation of the œsophagus in the greater curvature of the stomach (exclusion of the cardia); (3) implantation of the œsophagus in the jejunum (exclusion of the whole stomach). He believes that the outcome of such an operation will depend largely on the effect of thus mixing as it were the intrathoracic and intra-abdominal pressure. He has performed an *œsophagogastrostomy* on a dog with success.

[1] Journal of the American Medical Association, 1905, vol. xliii. p. 796.

[2] Annals of Surgery, 1904, vol. xl. p. 748.

[3] Revue de Chirurgie, 1903, vol. xxviii. p. 694.

THE INTESTINES.

It is difficult to classify articles written on the diseases of the small intestine, large intestine, appendix, and peritoneum for the reason that the effects of an injury or inflammation in one of these divisions extends to another, and writers allow themselves at least as wide a range as the pathological processes. Therefore, the reader should consult not only the articles on the subject in which he is interested, but the others as well, and especially those grouped under the title Peritoneum.

Rupture of Small Intestine. Knaggs[1] reports two cases of rupture of the small intestine from a crushing blow without external wound. The question of operation in these doubtful cases is always a difficult one. Knaggs believes that vomiting occurring after the initial shock is the most important symptom, and if accompanied by a slowly rising pulse exploration is clearly justified. To operate after every severe abdominal contusion he holds to be unjustifiable; yet the tendency on the part of American surgeons is clearly in favor of early operation after such injury whenever the symptoms do not constantly improve. This practice may result in some unnecessary operations, but delay forfeits many lives. One of Knaggs' patients operated upon on the day following injury did not recover. His intestine was ruptured at the junction of the duodenum and jejunum. Operation upon the other patient, a thirteen-year-old girl, was delayed for thirty-six hours. The perforation in this case was lower down, and very small. Even so, the intestinal coils were matted together with yellow lymph and very offensive pus lay between them. Bloody feces exuded from the perforated bowel and had collected in Douglas' pouch. Infectious material had also collected in the left kidney pouch. The abdomen was cleansed by wiping (?), the perforation was sutured, and three gauze drains and one rubber drain were inserted. The patient made a complete recovery in six weeks. It is interesting to observe that after nearly two years of good health the patient suffered from an abdominal abscess, which in a week burst through the scar and discharged most offensive pus. The sinus closed in three weeks and there was no further trouble up to the time of report, some two years later. The great pain caused by a laxative seemed to indicate the persistence of adhesions. This prolonged period of convalescence is also an argument for early operation. It is a good thing to save the patient's life; it is still better to save it so promptly that he will not suffer afterward from an abdominal abscess and adhesions.

Acute Intestinal Obstruction. *Diagnosis.* White[2] reviews some of the conditions most likely to be mistaken for acute intestinal obstruction. He mentions a case of appendicitis in which the slight initial fever, the general tenderness and distention of the abdomen, the absolute stoppage of the bowels, with continued vomiting becoming stercoraceous, seemed to indicate intestinal obstruction. The appendix had perforated early and the resulting small abscess and local peritonitis had really obstructed the small intestine.

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[1] British Medical Journal, 1904, i. p. 832.

[2] Lancet, 1904, i. p. 791.

Differential diagnosis between acute obstruction and *acute peritonitis* is increasingly difficult as the case progresses, for obstruction often leads to peritonitis. In favor of obstruction are these symptoms: rapid, feeble pulse; an ashy, pinched countenance; rapid distention of the abdomen which is not "board-like;" increased peristalsis; early and violent vomiting becoming stercoraceous; agonizing paroxysmal pain referred to the umbilicus; absence of pyrexia and leukocytosis, and cutaneous hyperæsthesia. The abdomen moves with respiration in the early hours of the obstruction.

In *acute pancreatitis* the bowels can usually be moved, the vomiting does not become stercoraceous, and the abdomen is not distended unless acute peritonitis develops.

Rupture of stomach or intestine is often suggested by the previous history, and the symptoms are likely to be more severe and sudden than those of obstruction. The abdomen usually becomes immobile and distended, and peritonitis develops early.

Thrombosis and embolism of the mesentery give symptoms closely resembling those of acute obstruction. The vomiting occurs early and may become stercoraceous, but it is not so prominent a symptom. If a large part of the mesentery is affected the distention is rapid and extreme. This affection almost always occurs in persons who have diseased hearts.

In *intestinal colic due to lead*, vomiting is not a marked symptom. Severe intestinal colic due merely to faulty diet is not common in adults, while intestinal obstruction, aside from intussusception, is rare in children. In doubtful cases the increase in the severity of the symptoms will in a few hours serve to distinguish simple colic from obstruction, provided no opiate is given.

Acute intussusception produces bloody diarrhœa and often some pure blood, and then constipation, while the movements in a case of severe enteritis always contain some fecal matter in addition to the blood and mucus; a tumor is palpable at least under anæsthesia.

Twist of the pedicle of a *pelvic tumor*, or *rupture of a dilated Fallopian tube*, an *extrauterine pregnancy*, or an *ovarian cyst*, may lead to mistaken diagnosis. The location of the lesion or the presence of a tumor with the history will serve to distinguish them from intestinal obstruction.

Hysteria, biliary and *renal colic* have all been mistaken for intestinal obstruction.

White asserts that the early symptoms of acute intestinal obstruction are caused by the strangulation of the bowel and not by the obstruction to the passage of its contents. Thus in obstruction due to a gallstone the symptoms are not very acute, while in volvulus they are very acute. In intussusception the symptoms are severe in proportion to the strangulation. Persons have been known to go a month without a movement of the bowels, the colon being full of impacted feces, and yet without any serious symptoms.

ORIGIN OF SYMPTOMS OF OBSTRUCTION. Clairmont and Ranzi[1] give the details of a long series of experiments upon animals to determine the formation of a poison in an obstructed intestine, and the effect of this poison upon the animals. They satisfied themselves that such a poison is formed in the ligated intestine of an animal and also in the human intestine when obstruction comes on spontaneously. Just what the nature of the poison is they were unable to determine. They proved, however, that the dilated portion of the intestine, proximal to the point of strangulation is in a state favorable to the absorption of any poisonous products within it. Thus the theory that autointoxication accounts for the toxic symptoms which are present in cases of ileus is supported by these experiments. The investigators hope at a later time to ascertain whether serum treatment will help to overcome the severer symptoms, such as coma and convulsions.

INTESTINAL OBSTRUCTION FROM IMPACTED GALLSTONE. Bridges[2] was called to see a stout woman, aged sixty-eight years, who had complained for three years of indefinite abdominal pains, worse at intervals. There was no jaundice. After a period of six weeks during which her symptoms were aggravated and she lost in weight, she was seized with pain in the left lumbar and umbilical regions, and vomited repeatedly. A few hours later her condition was worse. A diagnosis of intestinal obstruction was made, and the abdomen was opened above the umbilicus. On lifting the great omentum both collapsed and distended small intestine was seen and the site of obstruction located. A concretion was felt, cut down upon, and removed. The wound in the bowel was promptly sutured, but although the whole operation did not last more than thirty minutes, the patient was unable to rally. The concretion proved to be a gallstone, measuring seven-eighths of an inch in its greatest diameter. Unfortunately no post-mortem examination was made. At operation the hepatic region was examined but nothing abnormal found.

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[1] Archiv klin. Chirurgie, 1904, vol. lxxiii. p. 696.

[2] British Medical Journal, 1904, ii. p. 19

OBSTRUCTION FROM SYPHILITIC ULCER. Elder[1] mentions an instance of this very rare condition, so rare that some authors do not mention it, and others simply say that syphilitic ulceration of the intestine higher up than the rectum is rare. The patient in question was a man aged twenty-three years, who suffered for a month with pains in the stomach after eating, without vomiting or loss of flesh. There was alternate diarrhœa and constipation. Half an hour after a stool he was seized with sharp intermittent umbilical pain with persistent rectal tenesmus and nausea, but no vomiting. Collapse and abdominal distention followed with muscular rigidity. An exploratory incision was made. The peritoneal cavity contained serum and lymph, but no food or feces. About two-and-one-half feet above the ileocæcal valve the small intestine was closely surrounded by omentum and bound to the posterior peritoneum. These adhesions were old and firm. Their division did not relieve the intestinal distention above this point, and as a stricture of the intestine itself was palpable, resection of some three inches and a circular enterorrhaphy was performed. The patient recovered. The immediate cause of the acute obstruction was ulceration of the mucosa by which a bloodvessel was eroded. The blood stripped the mucosa from the muscularis, and the hæmatoma thus formed completely obstructed the already narrowed lumen of the bowel. The diagnosis of syphilis was confirmed by the presence of a typical tertiary ulcer of the eyelid, which healed under mercury.

INTESTINAL OBSTRUCTION AFTER TYPHOID FEVER. Goodall[2] reports two cases of obstruction by peritoneal adhesions due to typhoid fever. A boy, aged fourteen years, on recovering from a typhoid suffered from acute abdominal symptoms—vomiting, hiccough, and pain. These symptoms lasted three days and were thought to indicate a relapse. Three weeks later the symptoms recurred and the patient died. The small intestine was obstructed about thirty inches above the ileocæcal valve by a fibrous band, the result of peritonitis opposite a deep typhoid ulcer. The other patient, a man aged twenty-two years, was operated upon for perforation. No adhesions existed at that time, nor was there any generalized peritonitis. Two weeks later the patient began to vomit. A week afterward other symptoms of obstruction appeared, and the patient died suddenly. The small intestine was found to be kinked and compressed by adhesions in several places, and an ulcer situated just above the highest band had perforated. This was six feet above the ileocæcal valve.

It is rather surprising that deaths from adhesions following typhoid fever are rarely recorded. In Nothnagel's system of medicine this cause is not mentioned, although to perforative peritonitis is ascribed 16.5 per cent. of deaths from typhoid in Leipsic, 14 per cent. in Hamburg, and 31.7 per cent. in Johns Hopkins, Baltimore.

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[1] British Medical Journal, 1904, i. p. 1068.

[2] Ibid., i. p. 838.

OBSTRUCTION DUE TO ADHESIONS. No better illustration can be given of the danger of leaving raw surfaces in the peritoneal cavity than the history given by Hayes[1] of a young woman from whose pelvis a cystic tumor was removed. The adjacent coils of small intestine were adherent to the tumor. The patient did well for four days and then began to vomit so frequently in spite of one evacuation of the bowels that the wound was reopened on the ninth day. One loop of small intestine was found to be adherent to the scar of the incision by a broad band. In separating it the peritoneum was torn from the intestine for a distance of about two inches. This adhesion had kinked the intestine and produced the obstruction. Again the patient did well for four days, then severe vomiting recurred with constipation, and the abdomen was opened a second time and the loop of intestine freed and brought into the upper angle of the wound. Seven days later it was necessary to reopen the abdomen for the third time on account of adhesions and kinking of this denuded loop. This time it was brought quite out of the peritoneal cavity. For two or three days the patient suffered much pain and vomited many times. Then the bowels began to act regularly and all the symptoms of obstruction subsided. The loop of intestine became covered by granulations and gradually shrank into the abdominal cavity, so that it required no further treatment.

INTESTINAL OBSTRUCTION. TREATMENT. Barker[2] gives some rules which he has found valuable in the treatment of intestinal obstruction. Most of these patients are not seen until the contents of stomach and intestine have undergone fermentative and even putrefactive changes. He advocates washing the stomach by means of a stomach-tube several times until it is thoroughly cleansed. This is done before an anæsthetic is given. The mouth and throat are then washed with a warm antiseptic alkaline fluid, and the patient is given a hot drink of brandy and water. A very feeble patient is also given subcutaneously a pint of saline solution or a 5 per cent. glucose solution. This is isotonic with the blood, is therefore easily borne, and acts as a food as well as a drink. A rectal injection of warm saline solution or brandy and water is also helpful.

Barker inclines more and more to the use of a local anæsthetic, feeling that the chances of recovery are often reduced by the administration of a general anæsthetic to a patient whose respiration is embarrassed by abdominal distention, and whose strength has been lowered by fasting, vomiting, and the absorption of toxic intestinal products. He usually gives a little chloroform for a few minutes when the root of the mesentery is operated upon, for instance, if resection is performed. This method is less suited to the young and nervous than to the mature and the aged.

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[1] Lancet, 1904, i. p. 1500.

[2] Ibid., ii. p. 809.

When the abdomen is opened search should first be made for a loop of empty bowel in the right iliac fossa as a guide to the obstruction, which is usually low down. The relief of the obstruction requires no special rules, but in performing this act and in emptying a distended loop after incision the intestines should be kept within the abdominal cavity as far as possible.

It is often difficult to decide what to do with the distended and injured intestine. On this point Barker says: "From experience we know that this bowel is most probably ulcerated internally not only at and just above the constriction but often for a foot or two upward. What are we to do in such a case? To return the bowel after simply relieving the obstruction is to allow pints of fermenting feces either to remain stagnant or to escape into the empty, and as it were hungry, bowel below with all the risks of more abundant absorption of the poison than before. If this is not done one of two alternatives remains. Either we must temporarily drain the distended gut or boldly resect several feet of it with their contents and unite the upper and lower portions. Of the two I prefer the latter course. By this means we remove at one sweep all the septic bowel and its contents and with these the greatest dangers to the patient. These are the dangers of peritoneal infection with or without sloughing or perforation of the bowel and of toxæmia from absorption of its liberated contents as they pass into the intestine below. For the last five years I have generally acted on this principle with results far superior to any I was able to obtain previously.

"One point is perfectly clear from the experience of these recent cases —namely, that there is no more shock from removing several feet of bowel than there is from taking away a few inches. Again, we need to be reminded that the anastomosis of the remaining parts is equally easy or difficult independent of the length of the part resected. Let it be remembered that if the bowel be distended to only two inches in diameter every foot of it will contain more than one pint of putrid material."

Barker closes the abdomen without drainage unless general peritonitis is present. He urges these patients to sit up in bed from the first, and when they lie down to lie upon one side or the other so as to overcome the tendency to hypostatic pneumonia. One old woman was in an arm chair by the fire in six days. Ten grains of carbonate of bismuth are given by mouth three times daily. Albumen-water and brandy are given by mouth almost immediately, and light food in a few days, especially if resection has been performed.

Taylor[1] after reporting 13 cases of intestinal obstruction speaks of the benefit derived from *gastric lavage* subsequent to the operation when the stomach is filled with stercoraceous material. He believes equal relief will follow emptying the intestine. For this purpose he advises the method recommended by Kocher for the treatment of general peritonitis. An opening just large enough to admit the nozzle of a syringe is made high up in the jejunum and another opening is made low down in the ileum for the escape of fluid. By this means a stream of water is passed through almost the whole length of the intestine, and its contents are thoroughly evacuated. Both openings are then sutured, and the two loops of intestine are replaced in the abdomen.

Ranzi[2] reports the result of operations performed in Eiselsberg's clinic in Vienna for the relief of *ileus*. There were 23 cases of obstruction due to tumors or inflammatory exudates with 11 recoveries; 11 cases of strangulation by bands with 5 recoveries; 3 cases of volvulus all fatal, and 1 case of ileus due to pancreatic hemorrhage, also fatal. This gives a percentage of recovery for the whole series of only 42 per cent., which is sufficiently discouraging, and is really still more so when it is noted that most of the patients who recovered were simply treated by freeing of adhesions, or colostomy, or enterostomy. In the list of recoveries from the operation for the relief of ileus is included one colostomy, the patient dying from bronchitis eleven days after the operation. Enterostomy was performed 8 times with 6 deaths; enteroanastomosis 6 times with 4 deaths, and resection of the intestine 5 times with 4 deaths soon after, and a fifth one as a result of a second operation to close a resulting fecal fistula.

Many of the patients who came to operation had suffered from the effects of the ileus for days, only a few of them having had severe symptoms for less than three days. This factor alone counts strongly against a high percentage of recovery, even after the simplest abdominal operation. A number of the patients already had a well-marked peritonitis at the time of operation. Great credit is due to those who report thus frankly the unpleasant truths of surgery as well as the happier results.

Ranzi emphasizes the necessity of earlier interference in these cases. He advocates a radical operation whenever possible—viz., the extirpation of a tumor, enteroanastomosis, or resection of a gangrenous loop of strangulated intestine. The condition of the patient, however, usually makes it wiser for the surgeon to content himself with the relief of the ileus in the quickest and simplest way, leaving more radical measures for a subsequent operation.

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[1] Dublin Journal of the Medical Sciences, 1904, vol. cxvii. p. 321.

[2] Archiv klin. Chirurgie, 1904, vol. lxxiii. p. 783.

The percentage of recoveries in this list of cases is slightly above the average for the last ten years by prominent Continental surgeons. Ranzi gives the following table:

Operator or author.	Year.	No. of cases.	No. of recoveries.	Per cent.
Schramm	1884	190	68	35.7
Schede	1887	26	8	30.7
Obalinski	1894	110	38	34.5
Heidenhain	1897	30	14	46.6
Kocher	1899	78	56	71.7
Bergmann	1900	66	15	22.7
Mikulicz	1900	70	34	48.5
Prutz	1900	36	19	52.7
Zeidler	1900	17	8	47
Hepner	1902	31	15	48.5
Philipowicz	1903	67	25	37.3
Ranzi	1904	37	15	42.1
Total		758	315	41.5

These figures show very plainly the need of an earlier decision to operate even if the diagnosis is not exact. It is enough for the surgeon to know that something is wrong in the abdomen. In a recent article Wiggin[1] says: "It must constantly be kept in mind that a severe, sharp, and persistent abdominal pain almost invariably means peritoneal involvement provided the chest has been carefully examined and its diseases excluded, and that sudden cessation of such a pain accompanied by a rise of pulse rate and increased frequency of the respiration with or without a lowering of the bodily temperature usually denotes gangrene of the gut and its perforation. Many lives will be saved and thousands of others made more comfortable when physicians generally come to recognize that in all cases of persistent abdominal pain of obscure origin exploratory operations should be performed, for it has been my experience that a cause always does exist when such a pain is present, and that it is usually found with ease when looked for. Osler has wisely said, 'The surgeon is often called too late, never too early.'"

ACUTE INTUSSUSCEPTION. TREATMENT. Wallis[2] reports 4 successful operations for intussusception in children of two years or younger. No attempt was made to reduce the intussusception by manipulation or rectal injections, as Wallis believes that such methods should not be practised and *should not be taught.* The usual results of such treatment are loss of time, with loss of vitality of the infant, continuance of starvation, and a possible rupture of the intestine. In 2 cases the incision

[1] Lancet, 1904, vol. ii. p. 213.

[2] Ibid., i. p. 1648.

was in the right semilunar line, and in 2 cases in the median line, according to the situation of the tumor felt under anæsthesia. The intussusception was in all cases at the ileocæcal valve. The affected portion was lifted out of the abdomen, reduced and returned. No attention was paid to the thickened and inelastic condition of the invaginated bowel, as this quickly recovers. The incision was closed in one layer. The time of operation in the 4 cases was, respectively, twelve, fifteen, nine, and ten minutes. Feeding was commenced in each case a few hours after operation. Early diagnosis is essential to a speedy recovery, and it is not necessary to wait till a tumor can be felt. Vomiting and the passage of blood-stained mucus coming on suddenly in an otherwise healthy child are sufficient indications for an anæsthetic to be given. When the abdominal walls are relaxed any tumor present can be felt and dealt with.

Erdmann[1] advises a rectal injection provided the intussusception has not lasted more than six hours. He says this facilitates the reduction at operation, but in no case should operation be decided against because the injection has apparently entirely replaced the intussusception, because a small remaining intussusception at the ileocæcal valve may be thus overlooked, as one of his cases showed him. Had he trusted to an apparent reduction and not operated until later, a resection would have been necessary.

MULTIPLE INTUSSUSCEPTION. Riedel[2] operated upon a child for invagination of the intestine and found the ileum to have entered the cæcum and colon in the usual manner, while a retrograde invagination of the splenic and descending colon existed. There was also evidence of a third invagination which had been felt during life and had apparently been reduced by ingestions of water.

INTUSSUSCEPTION STARTING IN MECKEL'S DIVERTICULUM. It is known that Meckel's diverticulum may become inverted. According to Cheyne[3] 16 such cases have been reported and he adds a seventeenth from his own experience. Sometimes no other lesion has been found; sometimes the invagination has not stopped with the limits of the diverticulum, but has involved a part of the small intestine. Treatment is, of course, resection. In this way Cheyne saved his patient.

CHRONIC INTUSSUSCEPTION. Wallis[4] removed forty-two inches of small intestine on account of an invagination which had lasted over two years. During this time the patient had several attacks of abdominal pain and vomiting, but between them she enjoyed excellent health.

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[1] New York Medical Journal, 1904, vol. lxxix. p. 919.

[2] Mitt. aus der Grenzgeb. der Med. und Chir., 1904, vol. xiv. p. 218.

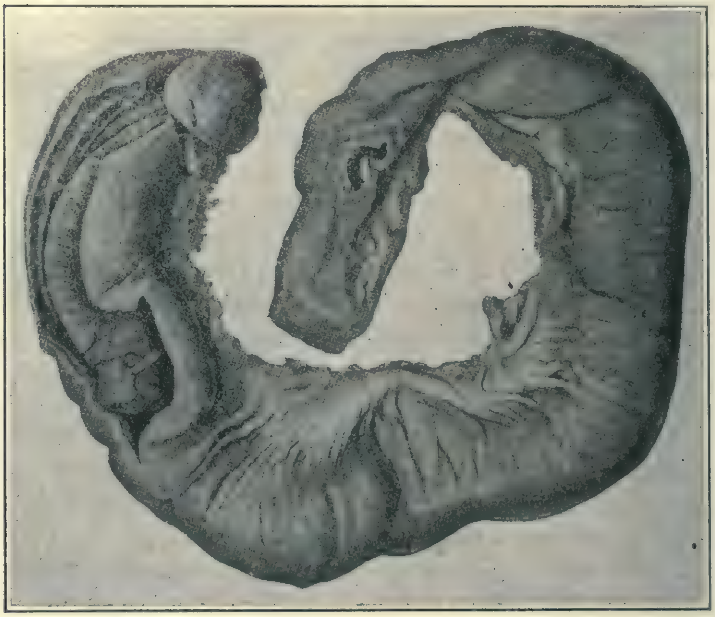
[3] Annals of Surgery, 1904, vol. xl. p. 796.

[4] Clinical Society Transactions, 1904, vol. xxxvii. p. 42.

The tumor could not be felt except in complete anæsthesia. The appearance of the specimen is shown in Fig. 19.

Riedel[1] cites a case of invagination of the intestine, the details of which lend support to Nothnagel's theory that invagination is due primarily to circumscribed contraction of the intestine. The spontaneous disappearance of the invagination which sometimes occurs is attributed to a relaxation of this contraction. Riedel's patient suffered for fourteen years with attacks of abdominal pain and swelling with vomiting and diarrhœa, lasting one or two days, and then entirely disappearing. Such attacks came on every two or three months. In one attack more severe than usual the patient noticed a hard mass as big as a hen's egg in the right side. This disappeared with all other symptoms in twenty-four hours. From this time on the attacks were more frequent, every two weeks, and the mass was regularly felt in the attacks. The only treatment was that of hot applications. Finally an attack came on so violent that a physician was summoned. In spite of the evidently increased peristaltic movements he made a diagnosis of perforative appendicitis and sent the patient to a hospital. No tumor could then

FIG. 19.



Chronic invagination of small intestine. (WALLIS.)

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[1] Mitt. aus der Grenzgeb. der Med. und Chir., 1904, vol. xiv. p. 229.

be felt on account of the abdominal distention, even when the patient was completely anæsthetized. The lower portion of the ileum was found invaginated into the ascending colon and already gangrenous. The constriction about it was very firm. An anastomosis was made between the healthy ileum and ascending colon and the gangrenous portion of intestine resected. The patient survived the operation only to die in three weeks of pneumonia secondary to an infected thrombus in the right iliac vein.

VOLVULUS OF THE SMALL INTESTINE. Volvulus of the entire small intestine on its mesentery is an accident likely to prove fatal, even if the patient is treated by operation, for as Vaughan,[1] who collected reports of twenty-one cases points out the condition is one of strangulation of the whole small intestine with injury of the sympathetic plexus and a severe toxæmia. Operation to be successful must be quickly performed, and when the abdomen is opened the recognition of the cause of the strangulation is by no means easy.

Whiting[2] reports two such cases, one patient dying without operation, while the other recovered after the abdomen was opened and the twist was relieved. This was done within four hours of the onset of the attack.

Roberts mentions a case in which operation revealed the true cause of the trouble but failed to save the patient.

Thrombosis and Embolism of the Mesentery. In his lectures on acute infective gangrene of the alimentary tract, Corner[3] says that about 150 cases of embolism and thrombosis of the visceral vessels of the abdomen have been reported. Most of these have been in the nature of pathological reports, but of late years since the attention of surgeons has been directed to these lesions, there have been also a good many attempts during life to avert the fatal issue. Few indeed have as yet succeeded, but even a few cures give encouragement for a prompter treatment.

In almost all cases the clot comes from the left auricle, taking its origin in mitral disease. Blockage of the arteries is more common than that of the veins in the proportion of 5 to 1. Involvement of the superior mesenteric artery is forty times as common as that of the inferior mesenteric, a disproportion which Corner believes to be made unduly striking by the fact that almost all of our knowledge of this disease is from the fatal cases. Anatomically it may be inferred that the organs supplied by the cœliac and by the inferior mesenteric will not become gangrenous if these vessels are occluded since there is such free anastomosis. Experiments upon dogs confirm this supposition. They also show that stoppage of the superior mesenteric will produce grangrene of the small intestine, doubtless for the reason that although not strictly a terminal artery anatomically, it is one physiologically on account of the great length of the intestine which it supplies (twenty-five feet in man). Yet even in these cases there is great variation in the amount of small intestine which becomes gangrenous, and in the length of time which the patient can live after the occurrence of the attack. The virulence of the bacteria present also seems to have an important relation to the extent and character of the damage done. These and other points have yet to be established by further reports of the conditions seen during life. From data already at hand Corner has prepared the following tables:

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[1] American Journal of the Medical Sciences, 1903, vol. cxxv. p. 799.

[2] Annals of Surgery, 1904, vol. xxxix. p. 1037.

[3] Lancet, 1904, vol. i. p. 1334.

Clinical Table.

1. Obstruction of the mesenteric vessels is most common in men past middle life.

2. It is most common secondary to valvular disease of the heart, especially mitral disease.

3. The onset is generally sudden with symptoms of peritonitis.

4. In one class the picture is one of intestinal obstruction or peritonitis due to appendicitis or the perforation of a gastric ulcer.

5. There is also another class in which blood is passed per rectum and which signifies infarction of the bowel.

6. Subacute and chronic cases are seen as well as the most acute.

7. In some cases there is probable spontaneous recovery, especially if only a small area of the bowel is rendered bloodless.

Pathological Table.

1. For a constant situation of the embolus in the superior mesenteric artery as in the main trunk all varieties of clinical cases have been reported, from the most acute and fulminating to cases like Chiene's[1] that recovered apparently without obvious symptoms.

2. With a precisely similar lesion some subjects die in thirty hours and some live from twelve to twenty days.

3. Gangrene of the gut has been noticed to occur within thirty hours and sometimes not after twenty-two days.

4. A collateral circulation can be formed in slowly developing cases of visceral vascular obstruction—*e. g.*, Chiene's case; and even in more acute instances an attempt at a collateral circulation is made.

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[1] Journal of Anatomy and Physiology, 1869, iii. p. 65.

5. The superior mesenteric artery is almost invariably picked out for the site of the embolus in fatal cases, possibly because it will always cause symptoms and almost always death, which need not occur with involvement of the inferior mesenteric and its branches or those of the cœliac axis.

6. The explanation of the individual variations, clinical and pathological, seems to depend upon the pathogenicity of the bacteria present in the gut. On the bacteriology of this affection there is no work done.

Jackson, Porter, and Quinby[1] say that the only rational treatment is exploratory laparotomy as soon as even a tentative diagnosis has been made. From the cases hitherto reported it appears that resection and suture is more of an operation than these patients are able to bear. Furthermore, it is often difficult to tell after the abdomen has been opened whether the gangrene has reached its limit. Hence, these writers recommend a more conservative procedure and one which is less likely to depress the patient as much as resection and suture. The involved loop is brought well out of the wound, so that there is a good margin of healthy intestine at either end. The peritoneum is flushed through a Tait tube if peritonitis is present. The cavity is then protected by gauze and the diseased portion of intestine is resected. The distention of the intestine will be relieved by this short operation, the patient will be protected from extension of the gangrene, and peritonitis may be avoided. If the case progresses satisfactorily, a secondary resection and suture can be performed.

The severity of this affection is shown by the fact that in their list of 247 cases there are only four recoveries noted. A fifth patient treated by the method described above was awaiting a secondary suture at the time of the report.

Kenerson[2] reports 3 cases of gangrene of a single loop of small intestine due to thrombosis or embolism. In the case of two men of middle life the condition came on without evident cause. In the third case a nine-year-old boy was kicked in the abdomen several times by a companion. Resection was performed in the case of this boy with success. Resection was performed upon one of the men without success. On account of the bad condition of the other adult at the time the abdomen was opened, resection was not attempted. The appearance of the abdomen in this case is shown in Fig. 20.

Payr[3] mentions 4 cases in which thrombosis of some of the branches of the *portal vein* followed operation. In 4 cases the veins of the omentum were affected. Three of these operations were for appendicitis and one for a stab wound. In all 4 cases it was noted that the omentum was more or less inflamed, but it was not gangrenous, and it was not subjected to any injury other than separation of any existing adhesions. At the close of the operation it was noted that either the whole omentum or a portion of it was so affected by thrombosis of its veins that resection was necessary. Three cases of venous thrombosis of the mesentery or mesocolon are also mentioned, necessitating resection a second time, and in one case a third time on account of extension of the thrombosis and threatened gangrene of additional intestine. The original

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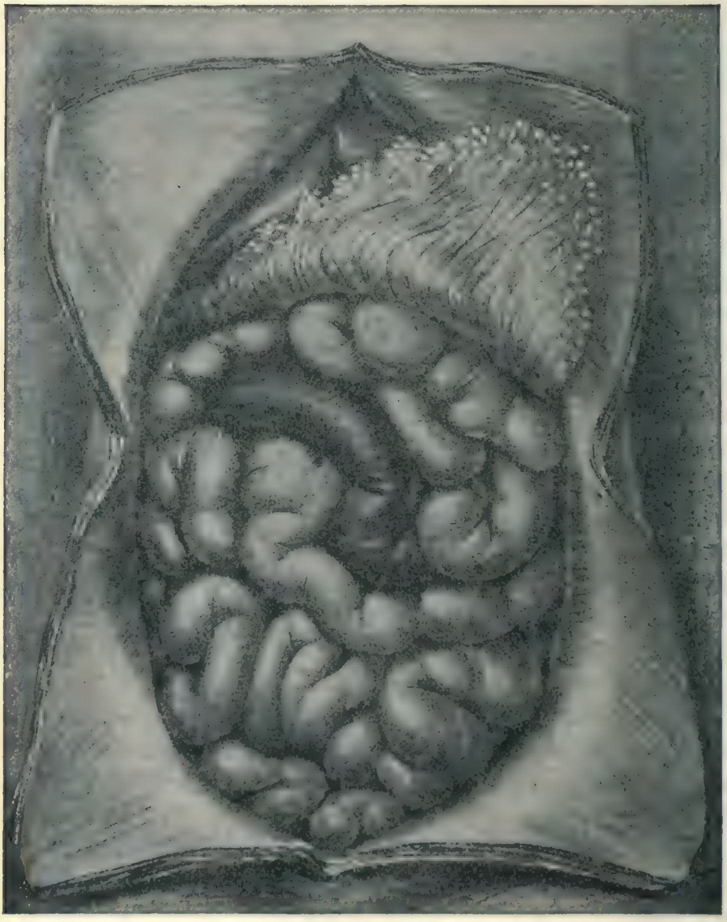
[1] Journal of the American Medical Association, 1904, vol. xlii. p. 1469; vol. xliii. pp. 25, 110 and 183.

[2] Annals of Surgery, 1904, vol. xl. p. 364.

[3] Centralbl. f. Chirurgie, 1904; Beilage, p. 59.

Fig. 20.



Appearance of the abdominal cavity in the second adult case of mesenteric thrombosis. One intestinal coil black, but surrounded by other coils of normal appearance. (Kenerson.)

operation in these 3 cases was for strangulated hernia. One of the patients recovered.

Perforation of the Small Intestine in Typhoid Fever. It has been said[1] that at least 16,000 patients die annually from typhoid perforation in the United States alone, and yet only a few are operated upon. This is in part due to the uncertainty of the diagnosis and in part to the forlorn condition of the patient. And yet 25 per cent. of recoveries is by no means unusual. According to Harte[2] there were 30 per cent. of recoveries in the 146 operations reported between 1899 and 1903. Many failures may not have been reported, but equally good results have been obtained in consecutive series of operations under favorable hospital conditions (37 per cent. at Johns Hopkins). If the perforation occurs in a child between six and fifteen years the prognosis after operation is twice as good according to Elsberg[3] (64 per cent. of recoveries after 25 operations). But even estimating the recoveries at 25 per cent., which is as much as the average operator under average conditions has reason to hope for, what a saving of the best young lives of the community if perforation were quickly recognized and operation promptly performed.

Stewart[4] reports 8 operations with 2 recoveries. In every case the perforation was in the ileum within three feet of the cæcum. If not found in the ileum and the condition of the peritoneal cavity plainly indicates perforation, the large intestine should be examined, since there are ulcers in the large intestine in 50 per cent. of fatal cases of typhoid fever according to recent examinations.[5] Furthermore, the ileum should be examined for a second perforation which exists according to some writers in one-fifth of the cases of perforation. Stewart believes an accurate diagnosis of perforation can usually be made if the physician will free his mind of the time honored Hippocratic picture of peritonitis, which Osler says is a "rough draft of death," and will watch the patient carefully and will promptly investigate any symptoms that arise. Pain was present in all of his 8 patients. The facial expression was altered in 6. Mental hebetude was present in all, and 3 vomited. None had a chill. In 1 case the temperature fell 3° to normal; in 5 it remained unchanged, in the other 2 it was not taken. The pulse and respirations were invariably accelerated. In 7 cases the respiration was thoracic. Sweating was noted in 6 cases, abdominal distention in 6 cases. Rigidity was present in all cases. This brief list of the common symptoms shows plainly enough that the diagnosis will be generally made and made within a few hours if the attending physician has the possibility of perforation in mind every time he calls to see a patient with typhoid fever. By such watchfulness the treatment of appendicitis has been brought to its present satisfactory state; the perforation of gastric ulcer has become generally recognized, and no less surely the perforation of typhoid fever will be promptly handled in the years to come.

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[1] Taylor, New York Medical Journal, 1902, vol. lxxv. p. 193.

[2] Annals of Surgery, 1903, vol. xxxviii. p. 63.

[3] Ibid., p. 71.

[4] American Journal of the Medical Sciences, 1904. vol. cxxvii. p. 795.

[5] Baer, American Journal of the Medical Sciences, 1904, vol. cxxvii. p. 787.

Elsberg[1] gives a partial report of 15 cases of perforation occurring in typhoid fever patients at Mt. Sinai Hospital, and treated by operation. An early diagnosis of perforation has generally been made, but the signs from which it is made, with the exception of a sudden abdominal pain, and the rarely demonstrable free gas in the peritoneum, are signs not of perforation but of the commencing peritonitis. Perforation is usually followed by an increased pulse and temperature. The condition grows then steadily worse, but only 4 of the 15 patients were in collapse at the time a positive diagnosis was made. Collapse depends a good deal on the amount of escaped intestinal contents. Distention was marked in 6 cases, slight in 8. There was diminution of liver dulness in 14 cases, not always due to free gas, however, as a distended colon or small intestine may crowd the liver backward and so reduce its surface area. In 7 cases the pain and tenderness were most marked on the right side of the abdomen. In 6 cases there were signs of free fluid in the flanks. The presence of free gas can be determined without moving the patient by percussing the abdomen when the head of the bed is raised, and again when the foot is raised. Elsberg very properly points out that a diagnosis from such nice points is much more likely to be made if the physician in charge of the patient carefully examines the abdomen of every typhoid patient from day to day so as to know the location of tenderness, distention of the colon, area of liver dulness etc. As for the operation itself Elsberg irrigates freely after suturing the bowel. With reference to drainage he says, "It is now well known that drainage of the general peritoneal cavity can seldom if ever be accomplished." It will generally suffice to pass a small strip of gauze or a cigarette drain down to the suture line in the intestine or underneath the sutures in the parietal peritoneum, and then to close the greater part of the abdominal incision. Four of the patients were operated upon by Elsberg. Three recovered, the fourth dying of a second perforation.

Haggard[2] finds reports of 295 operations for typhoid perforations with 80 recoveries, giving a mortality of 73 per cent. He classifies them as follows; 89 cases of free perforation, mortality 64 per cent.; 19 cases of localized peritonitis, mortality 53 per cent.; 138 cases of general peritonitis, mortality 79 per cent.

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[1] Medical Record, 1904, vol. lxvi. p. 47.

[2] Ibid., p. 89.

Even from South Africa comes a report of a successful suture of a typhoid perforation by Sanders.[1] The accident was so quickly recognized by the physicians in charge of the case that the operation was performed in less than five hours after the severe attack of colic which seemed to denote the breaking through of the intestinal wall. There was no escape of visible fecal matter, but a commencing peritonitis directed the search to the pin-hole opening. Another ulcer had nearly perforated, so that both were indented into the lumen of the intestine and sutured.

A rather startling proposition to reduce the probability of perforation in typhoid fever by early operation for removal of the appendix is made by Hammond.[2] The ground for this he sees in the fact that if the patient has suffered from previous attacks of appendicitis, the inflammation of the typhoid will set up again that of the appendix, while this in turn by its deposit of fibrin and formation of adhesions will favor perforation of the ileum. He mentions two cases, in one of which he operated after perforation had occurred without saving the patient. There were old adhesions around the appendix which seem to him to have been a factor in the failure of the patient to recover after the operation. In the other case he operated early in the typhoid as the patient gave a history of chronic appendicitis, and suffered a good deal from pain in the right iliac region. This patient recovered from the typhoid fever without perforation. The cases are too few of course for conclusions, but Hammond believes that one should remove the appendix whenever the patient who has had an attack of appendicitis gives early in an attack of typhoid fever symptoms which indicate a reinflammation of the appendix, such as pain and tenderness in the right groin and down the thigh, rigidity of the right rectus, nausea, and vomiting.

Physiology of Large Intestine and Appendix. Macewen's admiration for the functions of a portion of the large intestine and appendix seems like feeble-mindedness to those surgeons who believe that civilization has rendered the upper part of the large intestine useless, or even a positive drag upon the system. Such extreme views were recently expressed by Lane,[3] a surgeon to Guy's Hospital, London. He believes that the constant overloading of the cæcum and large intestine stretches and drags downward the cæcum, transverse colon and sigmoid and renders their proper evacuation well-nigh impossible.

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[1] Lancet, 1904, i. p. 1723.

[2] Journal of the American Medical Association, 1904, vol. xlii. p. 998.

[3] Lancet, 1905, ii. p. 1695.

"The harm done directly and indirectly by constipation is infinitely greater and more far reaching than that ascribed to alcohol," can hardly be intended literally. Be that as it may, Lane condemns the cæcum especially, calling it the cesspool of the intestine. His proposal is to do away with it entirely by anastomosing the ileum with the sigmoid. Lane says that " the only objection to this modification in the nature of the drainage of the tract is that if the patient is careless and does not attend to the daily evacuation of the rectum material may occasionally pass backward into the cæcum and hard masses of fecal matter may rest there and perhaps cause irritation. As a rule, these masses may be readily removed by an enema, but if the condition recurs and is troublesome he removes the cæcum and ascending colon up to the flexure. As by this time the patient has gained flesh and strength this operation, which is a simple one, is readily borne without risk or anxiety. The ideal primary operation would be the removal of the large bowel down to the junction with the ileum, but against such a measure there is the very unsatisfactory state of these patients which renders them quite unfit to undergo such a severe operation as the removal of nearly the whole of the large bowel without very grave risk of life. It is extremely important to operate at a sufficiently early date."

Such radical views have not passed unchallenged. Barrs[1] says that autopsies do not support Lane's views as to the grave changes in the condition of the intestine, the result of constipation alone. He believes that surgeons in too many instances exclude themselves far too much from the post-mortem room and the pathological laboratory.

In discussing Lane's paper editorially the *Lancet*[2] says: "We believe, however, that the time will come when physiology, anatomy, and bacteriology will supply us with such certain and detailed knowledge of the function of the great gut that the physician will be able to prescribe a diet and healthy conduct of life that will keep the colon busily occupied in the performance of its normal functions and prevent it from acting as a stagnant pool in the moving stream of the alimentary canal. In medicine, as in all other things, prevention is better than cure."

Rupture of Bowel by Air. Stone[3] reports a most unusual case of rupture of the bowel by compressed air, introduced into the rectum of a young man by some of his companions. The air in the reservoir was held at a pressure of twenty pounds to the square inch. When a tap was turned it all escaped in about a second. The abdomen was much distended, and a considerable quantity of air having a fecal odor was withdrawn by aspiration through a trocar. However, no operation was performed, and the patient died about three hours later, or about five hours after the receipt of the injury. At autopsy there were found two longitudinal rents in the bowel eight inches above the anus. There was a quantity of fecal matter in the peritoneal cavity.

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[1] Lancet, 1905, ii. p. 1888.

[2] Ibid., p. 1797.

[3] Ibid., 1904, ii. p. 217.

Colitis. Beck,[1] as Director of the State Hospital and the Surgical Division at Karlsruhe, has an excellent opportunity to observe patients suffering with chronic colitis, which he designates the most common affection of the intestine. He advocates exclusion of the colon by an ileosigmoid anastomosis, but only in suitable cases. His rules for treatment of these patients are:

1. The cause of the colitis is first to be ascertained, and the plan of treatment decided accordingly.

2. If the colitis is due to inflammatory processes in the neighborhood of the colon, such primary lesions are first to be overcome and preferably by operative measures.

3. If the colitis is due to carcinoma, tuberculosis, or actinomycosis of the colon, the diseased portion of the bowel is to be removed, or, if this is impossible, enteroanastomosis or colostomy should be performed.

4. A patient suffering from colitis from any other cause should have a thorough course of symptomatic-dietetic treatment.

5. If the colitis fails to yield to such measures, an anastomosis should be established between the ileum and sigmoid. This will usually bring about a cure of the colitis.

Beck reports six operations of this character. Five patients were greatly benefited or entirely cured. The sixth died six days after the operation. The Murphy button used had produced gangrene of the sigmoid and perforation.

In 500 cases of chronic colitis Beck ascertained the cause of the trouble to be:

	Times.
From disease of the appendix	120
From disease of the biliary tract	46
From disease of the stomach	44
From disease of the female pelvic organs	110
From peritoneal tuberculosis	7
From broken-down mesenteric glands	1
From enteroptosis	66
From carcinoma of the large intestine	31
From tuberculosis of the large intestine	8
From actinomycosis of the large intestine	2
From inflammations, etc., not in the immediate vicinity of the colon	65

Pauchet[2] divides cases of colitis into mucomembranous and ulcerative. The former produce constipation, pain, and mucomembranous stools; the latter produce the additional symptoms of bloody or purulent stools; a local point or points of tenderness, cachexia, and perforation (abscess, fistula). A case of colitis should be treated surgically only when medical means have failed. If the ulcer is limited it should be excised; if more extensive the colon should be put at rest (1) by a cæcal fistula, which permits irrigation, but is annoying to the patient; (2) by an ileosigmoidostomy alone, or (3) with unilateral exclusion of the cæcum and colon. Operation is indicated in mucomembranous colitis if the symptoms are severe or if the patient cannot afford the long rest and treatment which is required for a cure. Pauchet reports 12 operations upon such persons, with 5 cures, 5 improvements, and 2 cases in which there was no improvement of symptoms.

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[1] Archiv klin. Chirurgie, 1904, vol. lxxiv. p. 94

[2] Revue de Chirurgie, 1904, vol. xxx. p 638.

Michel[1] practised *ileosigmoidostomy* with unilateral exclusion of the cæcum and colon in a case of obstinate constipation of twenty-five years' duration associated with mucomembranous colitis rebellious to all previous treatment. The woman was completely cured.

Obstruction of the Large Intestine—Mechanical. Volvulus of the cæcum is rarely mentioned in surgical text-books. Manteuffel published a monograph on this subject in 1899 based on reports of 24 cases. Since then Faltin[2] has been able to collect reports of 80 cases, no less than 14 of which occurred in the hospital at Helsingfors. It would seem that this affection is peculiarly common in Finland. Faltin is unable to say whether the Finnish cæcum is more apt to possess a true meson or not; but he believes that the diet of the common people—sour bread, sour milk, potatoes, salt raw fish, etc.—are responsible for some of the very common diseases of the stomach and intestines. *Cæcal volvulus* occurs usually in young men. The symptoms are sudden abdominal pain, vomiting, and obstipation, meteorism, either oblique or transverse, and increased peristalsis. There is no marked abdominal tenderness, and the patient is able to receive a large rectal injection. The progress of the symptoms is slow. The vomiting may cease for a time, or later it may become fecal. The obstruction is usually only relative, and an individual attack may be recovered from. The results of operation have so far not been brilliant. The volvulus was untwisted (detorsion) in 59 cases with 28 recoveries. Resection has been practised 9 times with 3 recoveries.

Stricture of the Ascending Colon. Cullen[3] reports a stricture of the ascending colon due to *tuberculosis*. Although intestinal lesions are found in more than one-half of the autopsies performed upon tuberculous subjects, in less than 1 per cent. is there a more or less definite stricture of the bowel. The stricture is usually single and at the ileocæcal valve. Adhesions form between the ileum, cæcum, appendix, and omentum, and possibly loops of small intestine, or the process may extend to and involve the anterior abdominal wall. In such a late stage the diagnosis is unmistakable. At an early stage tuberculosis may be mistaken for sarcoma or carcinoma or appendicitis. The characteristic symp-

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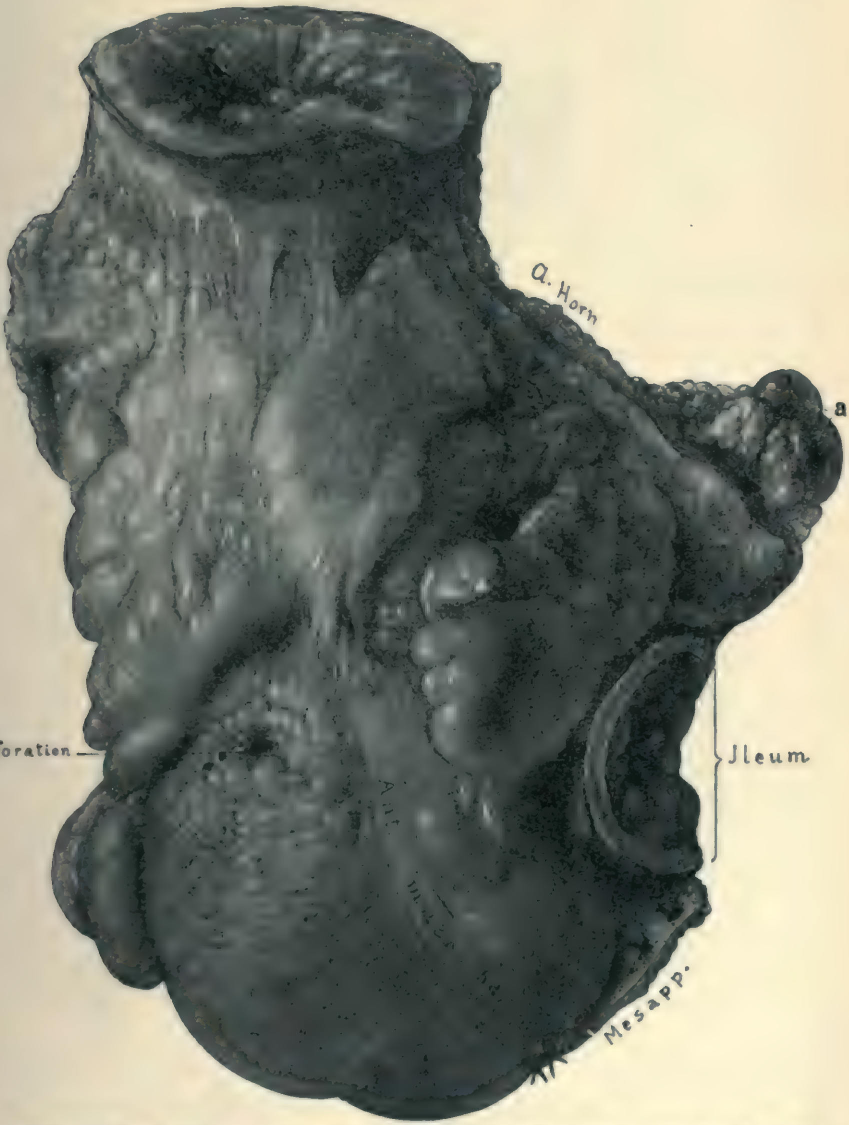
[1] La Semaine Médicale, 1904, p. 343.

[2] Deutsche Zeitschrift f. Chirurgie, 1904, vol. lxxi. p. 355.

[3] American Journal of the Medical Sciences, 1904, vol. cxxvii. p. 431.

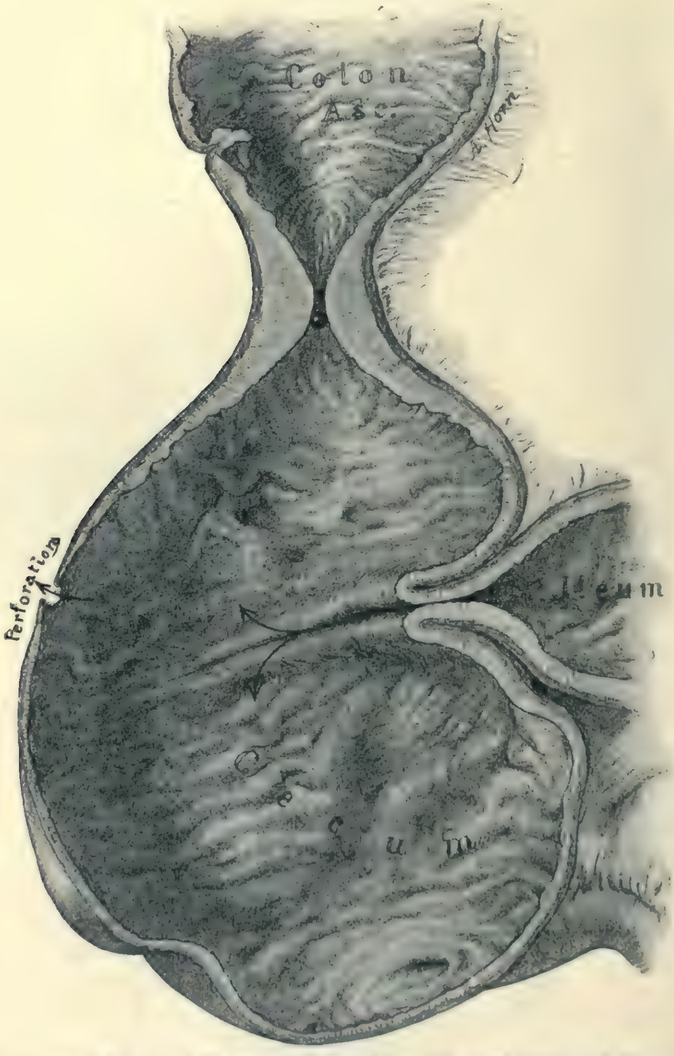
FIG. 21.



Tuberculosis of cæcum, with perforation: *a*, tuberculous lymph glands; the ligated mesoappendix is shown. (CULLEN.)

toms are a tumor of a slow growth in the right iliac fossa without much fever in a patient usually under thirty with a clinical history pointing to previous pulmonary tuberculosis. In certain cases a positive diagnosis cannot be made before operation, and perhaps not before pathological examination.

Fig. 22.



Tuberculous stricture of the ascending colon, with perforation of the cæcum. (Cullen.)

The resection of the diseased intestine should be thorough and palpably enlarged glands should also be removed. The stricture in Cullen's patient was so tight as to be quite occluded by a small bird-shot. Complete obstruction was caused by it and the cæcum had perforated. The appendix was adherent and was removed under the supposition that it had perforated. On examination its wall was found intact and further search showed the existence of a perforation in the cæcum (Fig. 21). The interior of the prepared specimen is shown in Fig. 22.

Cullen removed the lower third of the ascending colon, the cæcum, and a small portion of the ileum, uniting ileum and colon end-to-end, the first suture being introduced from within the intestinal lumina for two-thirds of their circumference. The patient made a good recovery.

Cullen insists on the importance of examining the right renal pocket when pus or other fluid has collected about the appendix. In this case it contained dark fluid different in appearance from that which had collected in the pelvis, and his attention was therefore drawn to the perforation of the colon.

Those who are interested in the pathology and clinical symptoms of tuberculosis of the intestine will find the subject fully discussed in an article in German by Hofmeister,[1] and one in English by Lartigau.[2]

Malignant Disease of the Colon. Clogg[3] analyses 25 cases of carcinoma of the colon, sigmoid, and upper rectum or rectosigmoid—a portion of the bowel which anatomically and clinically should be classed with the rest of the colon. Such a series of consecutive cases occurring in a single hospital offers a field for valuable study. Two types of growth were recognized. The first type involves three or four inches of bowel, and is soft, friable, extensively ulcerated, and does not materially narrow the lumen of the gut. The second type is of less extent and produces a marked narrowing of the intestinal lumen. The former type predominates in the cæcal region, and is not uncommon in the hepatic. The latter type occurs regularly in the rectosigmoid region and splenic region, but is also found in the hepatic region.

Obstruction of the bowel has been considered an early symptom of carcinoma because patients frequently do not seek medical aid until this symptom is present. Thus in 10 out of the 25 cases under consideration a surgeon was first consulted on account of complete obstruction. Yet in every case careful inquiry elicited the existence of well-marked symptoms antedating the obstruction by two or three months or more. These symptoms were pain, sluggish action of the bowels, deterioration in health, and sufficient loss in flesh to be appreciated by the patient. These symptoms were constant and progressive. Diarrhœa was not noted in any one of the 25 cases, and rectal hemorrhage in only a single case. Clogg warns against visible intestinal peristalsis as a sure sign of intestinal obstruction. He has seen it in cases of pyloric obstruction, of cholelithiasis, and in the crises of locomotor ataxia. Moreover, if obstruction exists and the two sides of the abdomen are equally distended, it is not safe to infer that the obstruction is in the rectosigmoid region. Such an equilateral distention existed in 4 cases of obstruction in the splenic region and in 2 cases of obstruction in the hepatic region of the colon.

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[1] Beitr. z. klin. Chir., 1896, vol. xvii. p. 577.

[2] Journal of Experimental Medicine, 1901, vol. vi. p. 23.

[3] Practitioner, 1904, vol. xix. p. 525.

Involvement of the lymphatic glands has often been said to occur at a late period in carcinoma of the colon. This is a misleading statement.

Clogg was able to examine lymph glands from 16 patients, and 13 times he found them to be carcinomatous. In some instances the areas of carcinomatous degeneration were small and were only found after prolonged search. This frequency of lymphatic involvement explains the "local" recurrence of the carcinoma which so often follows its wide excision. Numerous cases are on record in which a wide margin of healthy colon has been removed with the tumor and yet in a year or more the tumor has recurred at or near its original site and has again involved the bowel. This is not due to an infiltration of the wall of the colon far beyond the visible tumor, as sometimes happens in gastric carcinoma. Microscopic examination, made in reference to this point, showed invariably that the apparently healthy intestinal wall in the vicinity of the growth did not contain carcinomatous cells. Hence, in operating upon these patients the surgeon should assume that the regional lymph glands are affected and should endeavor to remove them in so far as possible. The location of some of these glands as shown by post-mortem examination in fatal cases is as follows:

1. In the cæcal region the glands form a chain extending for some distance along the ascending colon, and they also lie in the termination of the mesentery. Their removal therefore involves the sacrifice of some inches of ileum and most of the ascending colon. This should be accomplished if non-recurrence is to be hoped for.

2. In the hepatic region the glands (in the 2 cases examined) formed a distinct chain running for some distance along the lower border of the transverse colon. Hence, the removal of the right half of the transverse colon with its mesocolon should form a part of the complete operation for carcinoma of the hepatic region.

3. In the splenic region the glands form a chain extending along the lower border of the transverse colon to the median line. This half of the transverse colon with its meson should be sacrificed in the operation for carcinoma of the splenic region.

4. The glands involved by carcinoma of the sigmoid colon and upper

rectum are spread out in the corresponding mesocolon, whose lymphatics converge in a series of glands situated near the root of the meson. To remove them thoroughly means the sacrifice of practically the whole sigmoid. This necessitates either an artificial anus, with closure of the cut end of the rectum, or sufficient loosening of the peritoneum to permit of anastomosis between the colon high up and the rectum.

Clogg calls attention to a point not generally recognized, and that is the occurrence of suppuration as a complication of colon carcinoma. This was noted in 8 of the 25 cases, in 4 of which the tumor was in the cæcal region. The trouble is likely to be mistaken for appendicitis, from which it can be differentiated by its gradual development and subacute course. The fever is slight with only occasional rises to 101° or 102°. The tumor formed by the abscess is not very tender, and muscular rigidity is absent. The incision made to relieve the suppuration discharges pus with a fecal odor, or pus and feces. If radical operation is not attempted or is found impossible Clogg advises "short-circuiting" the bowel so as to relieve the patient of a permanent fecal fistula. While an artificial anus is bearable in the lower colon, and may be necessary to relieve obstruction, it is most annoying in the cæcum, and for irremovable carcinoma in the cæcal region ileocolostomy ought always to be performed if the patient's strength will permit. If the growth is so low in the rectosigmoid that ileocolostomy is impossible, simple colostomy must be performed. This Clogg defers until symptoms of obstruction manifest themselves, since the difficulties of the operation are not increased by distention of the bowel and the patient is saved the annoyance of an artificial anus as long as possible.

Wallace[1] operated upon 10 patients for *malignant stricture of the large intestine;* hepatic region 3 times, splenic region 5 times, rectosigmoid twice. Six of these patients sought medical advice for the obstruction, although all had previous symptoms. All had previous constipation, 2 constipation alternating with diarrhœa; there was loss of weight in 7 cases; distention and borborygmi in 4 cases; visible peristalsis in only 2 cases.

Pollard[2] reports 7 cases of carcinoma of the colon treated by operation. One patient died suddenly four years afterward with no sign of recurrence of the cancer. The others were living at the time of report, all apparently free from the disease, at periods varying from two months to four years. The tumor was situated in the ascending colon (2 cases), splenic flexure (1 case), descending colon (1 case), and sigmoid flexure (3 cases). Symptoms positively due to the tumor, such as loss of weight, pain, and interference with peristalsis, existed in all the cases from two to eighteen months before operation. A tumor was palpable in 6 cases, and had occasionally been felt in the seventh. The incision employed was usually oblique. In the first operation performed the tumor was isolated and brought outside of the peritoneal cavity. Colectomy was performed two weeks later. In the second case it was necessary to remove the left kidney and a part of the pancreas on account of involvement. The operation with the colectomy was completed at once, Murphy's button being employed for anastomosis. In the succeeding 5 cases the operation was performed substantially as follows: The surgeon first determines whether colectomy is possible, and, if so, how much of the bowel must be removed, and how far the peritoneum must be divided, and bloodvessels ligated, in order to give sufficient mobility for suture of the cut ends of the colon. This field of operation is then isolated from the rest of the abdomen by packing sterilized gauze around it. The growth and the accompanying bowel is next freed by ligation and division of its mesocolon. Great care should be taken to avoid injury to neighboring structures, such as the ureter or renal vessels. The affected colon should be so freed that it can readily be brought out of the abdomen, and surrounded with gauze. The colon is clamped with four Doyen clamps—two on either side of the tumor. The clamps which are placed upon the portions of colon to be anastomosed are two or three inches from the line of section. Those which are placed on the portion of colon to be excised are close to the line of section. The line of section is to be made close to the still attached mesocolon, and should pass obliquely across the bowel so that more bowel is removed on the side opposite the mesocolon.

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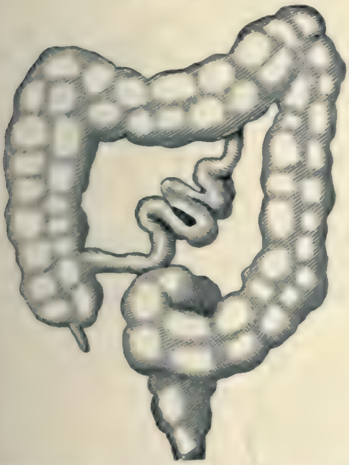
[1] Transactions of the Medico-Chirurgical Society, Edinburgh, 1904, vol. xxiii. p. 168.

[2] British Medical Journal, 1904, i. p. 175.

The interior of the ends of the colon to be sutured should be wiped out with dry gauze and then with gauze or cotton wet with bichloride of mercury 1:1000 before the suture is begun. In this way there will be less risk that the fingers will spread infectious material from the inside of the colon to the outside of the colon and thus to the peritoneal cavity. Pollard considers simple stitching preferable to any mechanical device. The two ends of the bowel are first fixed by a stitch at the mesocolic attachment. A continuous suture is then inserted from within the bowel passing through all the coats. This suture is begun opposite to the mesocolon and is carried past the mesocolon and as nearly around the whole circumference of colon as possible. The remaining one-sixth or more of the circumference is sutured from the peritoneal surface. This first suture is drawn tight enough to control hemorrhage. A second Lembert suture not passing through the mucous membrane is then inserted. The clamps are removed and the gap in the mesocolon is sutured, or if this is impossible the cut edges are sutured to the posterior peritoneum so as to close any opening in which small intestine might become strangulated. The field of operation is mopped with bichloride gauze and washed with salt solution, and the gauze packing is removed. The sutured colon is returned to the abdominal cavity and the abdominal wound is sutured without drainage unless, on account of oozing or some other complication, this is considered risky.

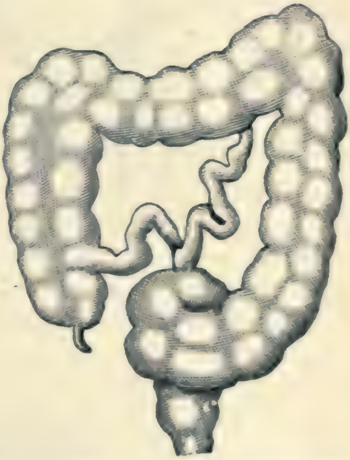
Pollard's technique is given thus at length because its simplicity appeals so to reason and because his uniformly good operative results show how much the abdomen appreciates respectful consideration. Such cleanly, simple technique should be the aim of everyone who enters the peritoneal cavity.

FIG. 23.



Intestinal exclusion, enteroanastomosis. (MOYNIHAN.)

FIG. 24.



Enteroanastomosis with constriction by suture of the part distal to the upper opening. (MOYNIHAN.)

Exclusion of the Intestine. A portion of intestines is said to be excluded when the fecal stream is diverted from it, and it is therefore rendered inactive. Such exclusion may be complete or incomplete. Of the various forms of exclusion theoretically possible, Moynihan[1] selects five which he considers worthy of a place in surgery. The accompanying drawings are here reproduced. These five forms of intestinal exclusion are:

1. Enteroanastomosis, as suggested by Maisonneuve; the "short-circuiting" of English writers (Fig. 23). 2. Enteroanastomosis with constriction by suture of the part distal to the upper opening (Fig. 24). 3. Unilateral exclusion. When the gut is divided completely across

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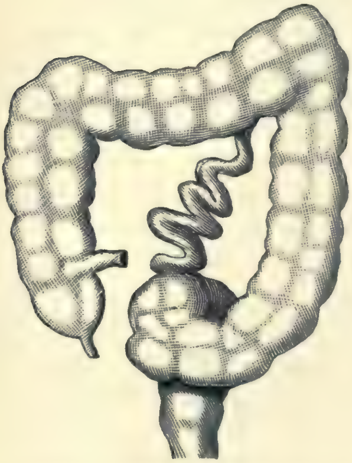
[1] Lancet, 1904, ii. p 1011.

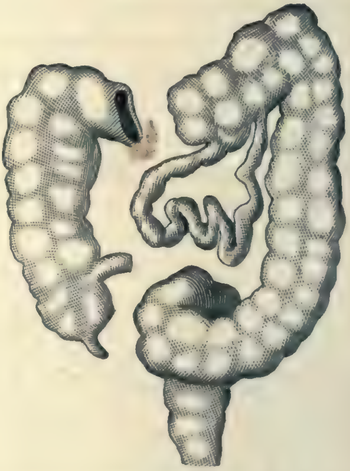
and the proximal end is implanted into the side of the distal, the distal end may be closed or may be left open (Fig. 25). 4. Bilateral exclusion. The bowel is divided at two places and the intestinal channel is restored, leaving a segment of the bowel detached. Of this segment one end may be left open and stitched to the skin (Fig. 26) or both ends may be closed when a fistula exists in the bowel lying between them (Fig. 27).

Fig. 25.



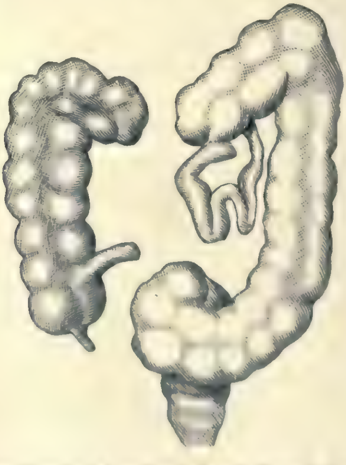
Unilateral exclusion. (Moynihan.)

Fig. 26.



Bilateral exclusion, the distal end of the excluded gut left open. (Moynihan.)

Fig. 27.



Bilateral exclusion, both ends of excluded gut closed; fistula. (Moynihan.)

In bilateral exclusion at least one end of the excluded gut should be left open for the escape of intestinal contents. This should usually be the distal end. Experience has shown that if both ends of an excluded portion of intestine are closed the secretion from its own wall may so distend the loop of intestine as to render necessary a second operation for its relief.

Exclusion has been performed for tuberculous or simple ulcers of the intestine which have produced chronic fistulæ and for intestino-vaginal fistula. In this case after bilateral exclusion, the discharge into the vagina soon becomes imperceptible. The operation has also been performed in chronic colitis, and in cases of malignant disease of the intestine too far advanced for removal of the tumors.

THE APPENDIX.

The most important contribution of the year to the literature of the appendix comes in the form of a large book from the pen of Kelly[1] and his assistant Hurdon, and the pencils of four Johns Hopkins artists. The teaching value of a drawing is very great if it is made by one who is an anatomist and pathologist as well as an artist. Brödel has succeeded so well in this field that he has had many followers. One of the chapters on the anatomy of the appendix, of which he is the author as well as part illustrator, calls attention to the interesting way in which the appendix is usually protected from fecal pollution. At its orifice are two folds of mucous membrane named for those who have previously described them, Gerlach and Nanninga. These folds are not true valves, but they act as such and prevent the passage of fecal matter from the cæcum into the appendix, provided *the angle between the two organs is a slight one*, 20 degrees or 30 degrees. If it is greater than this the orifice may be open for the passage of matter in either direction, even if the folds are well marked (Fig. 28).

Within twenty years from the time when Fitz coined the word appendicitis, and declared the appendix to be the origin of the manifold forms of inflammation in its vicinity, the knowledge of this subject has become so complete that American surgeons are thoroughly in accord upon most of the details. There can be no more striking evidence of the progress of modern surgery, and there is none upon which American surgeons can more justly pride themselves. It is fitting that the record of their achievements has been placed in such a permanent and perfect form by one of their own number.

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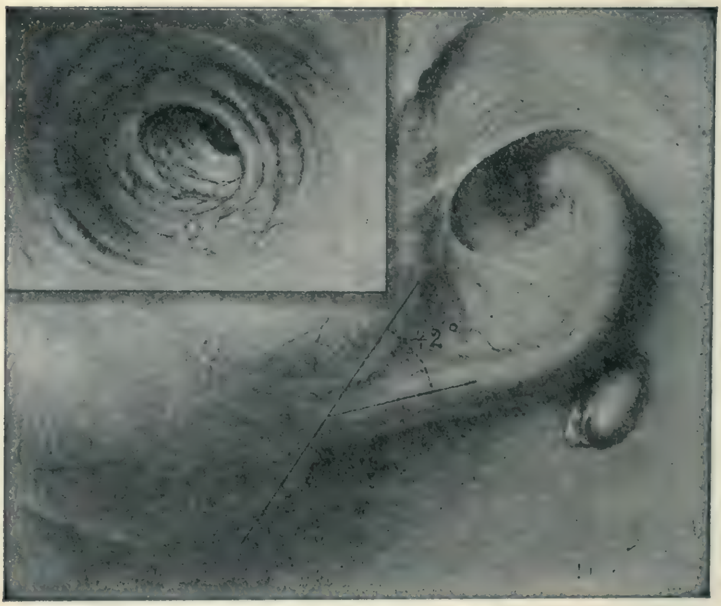
[1] The Vermiform Appendix and its Diseases. Kelly and Hurdon. Philadelphia, 1905.

Physiology of the Appendix and Cæcum and the Causation of Appendicitis. Macewen[1] was enabled to study the interior of the cæcum in a man who was wounded by an explosion. The anterior wall of the cæcum was destroyed, exposing the ileocæcal valve and the appendicular orifice. There was a considerable flow of glairy mucus from the appendix and cæcal surface which did not constantly exude or at least did so to a greater extent shortly after food was introduced into the stomach and to a marked extent just before food began to pass through the ileocæcal valve. On one occasion quite a stream of fluid poured from the appendix just before the chyme began to pass through the ileocæcal valve. When chyme passed through this valve it did so in small quantities at a time, and there were occasional pauses in which the ileocæcal valve seemed to close—probably by a reflex action. This fluid from the cæcum and the appendix was invariably alkaline. This patient, who was very observant, took quite a philosophic interest in his condition and was rather proud that his misfortune could be made of service. It was seen that his will power had no effect upon either the secretion or on the control of the ileocæcal valve; but one day when he was much disturbed

FIG. 28.



The appendicular orifices in connection with a cæcoappendicular angle of 42 degrees. (BRÖDEL.)

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[1] Lancet, 1904, ii. p. 995.

by the reception of "bad news" which could not be kept from him, and after which he said he had indigestion or was "bilious," the secretion in the cæcum was at first very watery and then the surface became drier than at any previous time and apparently the contents of the small intestine were more quickly evacuated and overflowing gave rise to smarting and irritation on the sides of the wound. The chyme was acid, and the cæcal secretion being scanty was not sufficient to neutralize it. Usually the flow from the ileocæcal valve was slow, the material passing into the cæcum in small quantities which sliding over the orifice of the appendix were smeared by the exudation therefrom, as well as mixed with the exudation from the general cæcal cavity.

Macewen was led to the conclusion that the discharge of the contents of the small intestine into the cæcum, acting on the nerves of the mucous membrane of the cæcum and appendix, sets up a reflex action which controls the quantity of the discharge through the ileocæcal valve. Pawlow's experiments have shown that a similar reflex action governs the discharge of acid contents of the stomach through the pylorus.

The appendix has been regarded as a mere diverticulum of the cæcum, and yet its vascular and nervous supply pertains more to that of the small intestine than to that of the colon. Its muscular fibres, both circular and longitudinal, are continuous with those of the cæcum, hence it is easy to see that movements in the cæcum can be excited by primary movements in the appendix. It is known that the mind has an influence on the small intestine through the vagi, sometimes exciting peristalsis and sometimes arresting it. The appendix is subject to the same mental effects.

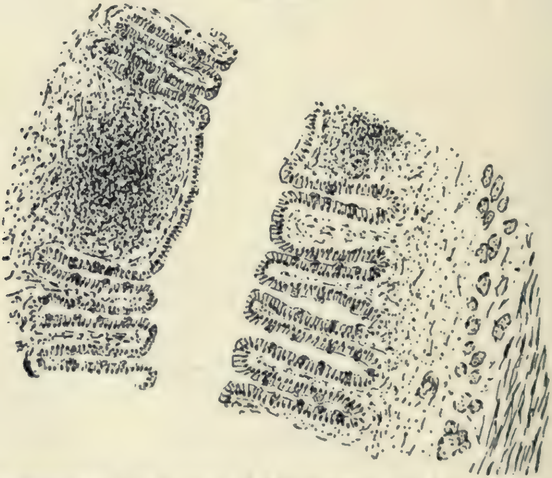
The *succus entericus* which is exuded by the glands of Lieberkühn has hitherto received scant attention from physiologists. It is of great importance in increasing the activity of the pancreatic ferments. Thus Pawlow found that while pancreatic juice alone took six hours to dissolve fibrin in a thermostat, and had not even attacked white of egg after ten hours, the addition of some succus entericus to the pancreatic juice dissolved the fibrin in from three to ten minutes, and the white of egg in from three to six minutes. The glands of Lieberkühn are far more numerous and better developed in the appendix and cæcum than in the small intestine (Fig. 29). Therefore, the succus entericus which is poured out so abundantly from these parts must be a powerful aid in the complete digestion of the matter which passes the ileocæcal valve.

Micro-organisms find in the cæcum and appendix an alkaline medium favorable for their growth, and in the chyme plenty of nourishment. Degenerated micro-organisms have been repeatedly found in large numbers of the walls of healthy appendices taken from animals.

Macewen suggests that the cells and nuclein of the solitary follicles in the appendix have a controlling action on the organisms, and one of the functions of the appendix may be to maintain cultures of these organisms in a fit state to perform their function on the pabulum poured into the cæcum.

The chyme from the ileocæcal valve is directed toward the orifice of the appendix, and receives there its portion of succus entericus and germs, fitting it for the completion of digestion. The appendix, while having in itself the muscular and nervous mechanism necessary for emptying its contents in any position of the body, is in the majority of instances so placed that the action of gravity favors the escape of the contents into the cæcum. The action of gravity favors the retention of the chyme into the cæcum until the cæcal digestion is completed, when muscular movements are originated for its expulsion (Fig. 30).

FIG. 29.

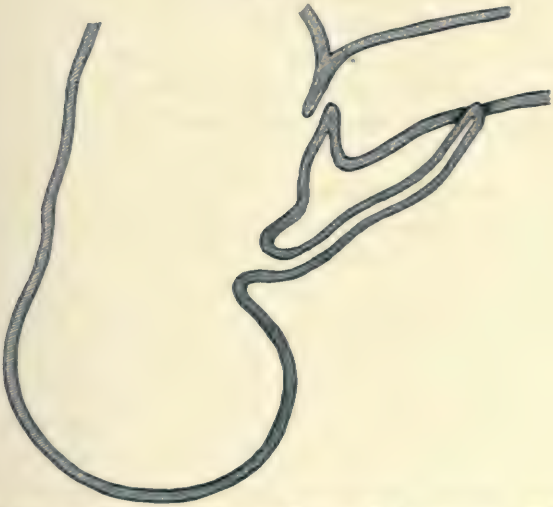


Longitudinal section of the glands of Lieberkühn and lymphatic follicles taken from the appendix. (MACEWEN)

If the cæcum and the appendix perform an important part in the final stages of digestion, it is not to be wondered at that interference with the functions of those parts gives rise to disease. Deaver asserts unhesitatingly that appropriate inquiry will elicit a history of digestive disturbances in almost every case of appendicitis.

In the present state of our knowledge it is difficult or impossible to distinguish between indigestion arising in the stomach or small intestine and that arising in the cæcum. We know, however, that the latter does occur, and if it continues both cæcum and appendix suffer. There will be want of proper exudation of succus entericus in quantity and in quality and lowering of the activity of the solitary lymphatic glands which will no longer control the germs which swarm in that cavity. The bacillus coli communis, which is the surgeon's terror, serves in its proper place a beneficent purpose in effecting the disintegration of some of the undigested matter, but when uncontrolled by the healthy organs and their exudations is apt to cause ravages in the tissues and to produce toxins which are lethal. If from inhibition of the appendicular and cæcal movements or the want of exudation of the succus entericus, or if the cæcum receives material which the succus entericus cannot digest, stasis occurs in the contents of the cæcum and constipation, which is so often a feature of the appendicitis, ensues. At a later stage fermentative disintegration of the fecal contents with absorption of toxins and damage to the wall of the parts are also apt to ensue. These are followed by diarrhœa which is sometimes curative.

FIG. 30.



Scheme of cæcum, ileocæcal valve, and appendix in section. (MACEWEN.)

Involution of the Appendix. Morris[1] claims that the appendix undergoes a normal involution in middle life, but sometimes much earlier. He supports this claim both by citing cases and by microscopic examinations. One appendix which he removed from a patient who had for many months mild symptoms and a very slight local tenderness "presented no external evidence of infection changes. On longitudinal section it was observed that nearly all of the distal half of the appendix had undergone a normal involution process, with obliteration of the lumen, and replacement of the lymphoid and mucous layers by connective tissue. The part that showed involution change had a slightly lesser diameter than the part that still possessed a lumen. Microscopically the peritoneal covering was normal. The two muscular coats were undergoing a degeneration process. The lymphoid and mucous layers had entirely disappeared, and were replaced by connective tissue." The condition is associated with symptoms of intestinal fermentation which may last some years and disappear when the involution is complete. The treatment is symptomatic only, unless the patient prefers to have his appendix removed rather than to continue medical treatment for some years.

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[1] American Journal of Obstetrics, etc., 1902, vol. xlvi. No. 4.

Experimental Appendicitis. Van Zwalenburg[1] has been able to produce appendicitis at will in dogs by ligating the appendix and then producing beyond the ligature an intra-appendicular pressure equal to the arterial pressure. Simple infection does not account for the severity of the onset in human appendicitis, and this experimenter therefore believes that a process takes place in man similar to that which followed ligation and distention in the dog. This would account for the pain, and if kept up for a few hours would account for the rapid gangrene, since there are always present in the lumen of the appendix germs to multiply in the tissues whenever their vitality is lowered by the distention.

Appendicitis due to Pneumococci. Shaw and French[2] report a fatal case of appendicular abscess occurring in a girl aged eighteen years due to the pneumococcus, an almost pure culture of which was obtained from the pus. The autopsy showed the lungs, pleuræ, pericardium, kidneys, liver, spleen, pancreas, suprarenals, pelvic viscera, brain, and meninges to be perfectly normal. There was about a pint of turbid serum in the peritoneal cavity with coagulated lymph, thickest about the cæcum. The appendix was much inflamed and buried in lymph and pus, and there was pus in the lumen, but no visible perforation was present. The case was therefore recorded as one of primary pneumococcal appendicitis.

Appendicitis among the Arabs. It is stated by Brunswic-Le-Bihan[3] that Arabs are not free from appendicitis, that the Arabs of the plains who live on vegetables do not suffer with it, but it attacks Arabs of the cities who eat meat. He operated upon 12 Arabs at a hospital in Tunis and in each case the suppuration was retrocæcal. To explain this unusual fact he examined 36 Arab cadavers and found the appendix retrocæcal in 26 of them, and in 21 of these cases there was no meson, but the appendix was smoothly covered by the peritoneum of the iliac fossa; so that its posterior surface was in intimate contact with the subperitoneal tissues.

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[1] Journal of the American Medical Association, 1904, vol. xlii. p. 820.

[2] British Medical Journal, 1904, ii. p. 18.

[3] La Semaine Médicale, 1904, p. 343.

Diagnosis of Appendicitis. In making a diagnosis of acute appendicitis Bell[1] says that four points should be borne in mind. 1. If the patient is a woman the possibility of right-sided tubal or ovarian trouble should be excluded. 2. Cutaneous hyperæsthesia of the eleventh dorsal nerve is a valuable sign if present, and may precede rigidity, but in its absence appendicitis is not to be ruled out. 3. When perforation has taken place palpation under an anæsthetic will serve to locate it; for observation has shown it to be a general law that in rigidity of the abdomen consequent upon some acute lesion the site of the lesion is situated beneath that area of muscular rigidity which is the latest to relax as anæsthesia progresses. 4. Changes in the pulse and temperature must be interpreted in conjunction with other signs. Thus a low temperature, slow pulse, and disappearance of pain are often indicative of gangrenous processes, septic peritonitis, and the beginning of the end —not of convalescence.

The following points are helpful in deciding upon the necessity of operation in chronic appendicitis: 1. If the patient suffers from slow chronic dilatation of the cæcum with inflammation of the same, and there are at intervals definite attacks of colic located in the appendicular region or elsewhere, or attacks of an obscure nature, accompanied or not by increased temperature and vomiting with more or less abdominal pain, it is probable that the patient will not recover until the appendix is removed. 2. If such a patient is not relieved of symptoms by aperients, intestinal antiseptics, lavage, and selected diet, and above all if abdominal massage increases instead of relieves symptoms, there is some irritant cause of the symptoms, probably an inflamed appendix. 3. Hyperæsthesia along the outer edge of the right rectus muscle, not in the skin, but in the abdominal wall, is a common sign of chronic appendicitis. So is the presence of a reflex pain at the umbilicus or in the hypogastrium, which is not increased by pressure at the spot to which the pain is referred, but is distinctly increased by pressure upon the appendix, not perhaps tender in itself.

Russell[2] emphasizes the importance of distinguishing superficial from deep pain in making the diagnosis of appendicitis. The pain felt by the patient is often referred to some other region than the appendix, and if there is surface pain in such region the observer is still more likely to make a wrong diagnosis. Deep tenderness is a far more reliable sign, and this can usually be elicited by careful palpation, even when the muscles are rigid. In one case mentioned this deep pain could only be brought out by rectal examination owing to the situation of the appendix.

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[1] Lancet, 1904, i. p. 1556.

[2] Ibid., p. 787.

Russell's conclusions are of interest as representing the attitude of one whom a surgeon may perhaps designate as an enlightened conservative without giving offence:

1. Certain appendices are so formed anatomically that they of necessity give rise to trouble. 2. Interference with the drainage of the appendix is an important factor in determining inflammation. 3. The occurrence of appendicular colic may be taken as a warning that dangerous anatomical conditions exist in connection with the appendix. 4. In all abdominal cases detailed palpation should be carefully and patiently carried out. 5. Too much emphasis must not be put on the site of the pain or on superficial tenderness. Palpation should be directed toward ascertaining the actual condition of the diseased part. 6. Statistics show that from 90 to 95 per cent. of cases recover without operation and the chances against recurrence are as 3 to 1 or thereby. Therefore routine removal cannot be accepted as necessary. 7. Operate at once in any case with a history of previous attacks, also in all cases commencing with a rigor. 8. The chief difficulty lies in the early recognition of the cases in which the appendix will necrose or perforate rapidly. In this connection suspect cases which show constitutional disturbance with little inflammatory reaction round the cæcum but with marked tenderness on deep palpation and an ordinary degree of leukocytosis. 9. In cases which do not call for immediate operation pain may be relieved by hot or cold local applications and by a cautious and sparing use of opium or morphine or of belladonna. Lavage may give good results. 10. Medical treatment should not be relied on for more than from twenty-four to forty-eight hours if severe pain continues or an acute tenderness on deep palpation still remains. 11. Later in the disease a continuance of the local and general symptoms along with a high leukocyte count indicates the presence of pus and the necessity for operative interference.

Value of Leukocyte Counts in Appendicitis. French[1] contributes a paper on the leukocyte count in appendicitis based on a study of 83 consecutive cases. Early investigators of this symptom laid down the absolute rule that pus is always present if the leukocyte count exceeds 20,000. Yet it has been found that patients sometimes recover without operation after having such leukocytosis, and presumably pus was not present. Later the importance of a *rising* leukocyte count was emphasized. While this is certainly a good sign of pus, yet it must not be overlooked that pus may be present with a stationary or even a falling count.

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[1] Medico-chirurgical Transactions, 1904, vol. lxxxvii. p. 467.

In order to obtain the greatest good from the results of his study, French divides the cases into four groups:

Group I. (21 cases). The symptoms in Group I. were acute or gradual onset, vomiting perhaps in first twenty-four hours, seldom thereafter; usually constipation; pain, tenderness, and possibly rigidity, all limited to the right iliac fossa, but *without tumor*. These patients all convalesced without operation. In 3 cases operation was performed during convalescence. Adhesions were found about the appendix, but no pus or gangrene. It is fair to assume that no pus existed in any of these cases, all of which terminated in recovery. In most of these cases there was little or no leukocytosis. In two-thirds of them the count did not exceed 15,000, but in 3 cases it exceeded 20,000, and in 1 case reached 31,000, without the appearance of any other symptom indicative of pus as has been stated.

Group II. (23 cases). In this group the clinical signs were local, but in every case a definite tumor could be felt. Operation was discussed but not considered necessary, and all of these patients convalesced without operation. In 2 cases operation was performed during convalescence and there were adhesions but no pus.

In this group the leukocytosis exceeded 15,000 in one-half of the cases and 20,000 in more than one-third. The highest count was 31,000. All of these patients recovered.

Group III. (26 cases). In this group the clinical signs were local, but pus was proved to be present, either by operation or by the rupture of an abscess into the bowel. In three-fourths of these cases the leukocytosis exceeded 15,000, and in two-thirds the count was at one time above 20,000. Yet in only a quarter of these cases was the count clearly above the maximum of the other groups. In these 6 cases it reached points between 34,000 and 56,750. But the value of a rising count is strikingly shown by a number of the cases in this group.

Group IV. (6 cases). The clinical signs in the cases of this group were not confined to the right iliac fossa, but were general all over the abdomen. All of the patients were operated upon. Three died; 3 recovered. In one-half of these cases the leukocyte count was less than 11,000. Two of these patients died. In the remaining 3 cases the count was at some period over 30,000. Two recovered. It is generally recognized that the leukocyte count is of little value in these cases complicated by acute general peritonitis.

"Leukocytosis is thought to depend on chemotaxis; perhaps in a mild case there is a small dose of toxin; the chemotactic effect on the leukocytes is slight and they do not increase. In a severe case there may be a large dose of toxin, the chemotactic effect may be greater, and the leukocytes increase. The dose of toxin may be great enough even with non-purulent inflammation of the appendix to cause a leukocytosis. Finally, it seems that a very virulent toxin, as in a bad case of acute appendicitis, may prevent the leukocytes from increasing at all. Perhaps the number of leukocytes may thus afford a measure of the virulence of the attack, or of the lack of reacting power in the patient; but this is theoretical.

"As a diagnostic sign of acute peritonitis the leukocytes are not to be relied upon. In this respect they may be compared to the temperature, which may be up or may be down or may be normal. In diagnosing general peritonitis far more stress must be laid upon the pulse rate, the persistent sickness, the abdominal rigidity, and immobility, and the facies Hippocratica, than upon either the leukocytes or the temperature."

The remaining cases in this series were of such unusual character that they were excluded by French from the four definite groups.

These conclusions are in accord with those reached by Cazin and Gros,[1] who made a systematic count in 17 mild cases of appendicitis ending in resolution. In 6 cases the maximum count was not above 15,000; in 8 cases it was between 15,000 and 20,000; while in three cases it reached some figure between 20,000 and 23,000. In mild cases the count never remains at such high figures, but invariably drops on the following day, often nearly one-half. Their conclusion is that leukocytosis at the commencement of an attack of appendicitis does not indicate the character of its termination, notwithstanding a high temperature or severe local pain, even when the increase in the number of leukocytes is *momentarily* as high as 20,000 or 25,000. But when the number of leukocytes is *permanently* increased it clearly indicates suppuration, whatever the other symptoms may be.

Appendicitis in Children. McCosh[2] says that the frequency of appendicitis in childhood is not sufficiently appreciated. He reports the ages of 1000 patients operated upon by himself, showing that 5 per cent. of them were ten years or under, and only 3.5 per cent. were over fifty years of age. The diagnosis in the child is more difficult than in the adult. The infant, and even the child, cannot localize pain or tenderness in the abdomen. It screams and contracts its muscles whenever any part of the abdomen is touched. If the surgeon succeeds in diverting its attention he may gain some information as to the relative sensitiveness of different parts of the abdomen, and the location of muscular contraction. Vomiting is the most persistent symptom in a child, even when no food is given. If it continues without obvious reason and there is abdominal pain, and no movement of the bowels, the disease is probably appendicitis. A rapid pulse and high temperature are of more value in determining the severity of the process than in making a diagnosis, since they are produced in childhood by so many causes. The most difficult differential diagnosis lies between appendicitis, diaphragmatic pleurisy, bronchopneumonia, and gastroenteritis. Persistence of vomiting for twenty-four hours with constipation favors appendicitis. High fever suggests gastroenteritis. The development of abnormal chest sounds will, of course, determine the presence of pleurisy or pneumonia, but in the absence of these signs it is sometimes impossible to make a certain diagnosis and one is sometimes compelled to wait a few hours before giving a final decision, if he would avoid the unpleasant experience of opening the abdomen of a child suffering from pneumonia.

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[1] La Semaine Médicale, 1903, p. 141.

[2] Journal of the American Medical Association, 1904, vol. xliii. p. 853.

Bennett[1] recognizes that appendicitis in the young often gives rise to symptoms which may mislead. He cites the case of a boy aged fifteen years who, when first seen, had a "flushed face with dark lines under the eyes, a temperature of 101°, a certain amount of tenderness over the right side of the abdomen low down, but no distention worth mentioning, and no swelling or thickening of any kind was perceptible." By the next day the temperature had dropped to 97°, the pain was gone, the rigidity was very slight, and still no swelling of any sort could be found. The house surgeon considered the boy better, but Bennett recognized that his more comfortable state was due to the advancing sepsis which had benumbed his faculties. He operated; opened a foul abscess which contained the perforated appendix, and saved the boy. It is a good thing to recognize the fact if a child is dying of septic poisoning, but far better to remove the cause of the poison before the disease has progressed so far.

Brannan[2] confirms the difficulty of diagnosis in children. In testing the abdomen for tenderness more reliance can be placed upon the action of the child as evidence of pain than upon his statements.

Treatment by Delay. Jonnesco[3] advocates delay, and no wonder, considering the results of his operations. He lost 44 per cent. of 25 patients upon whom he operated promptly for acute appendicitis, and 14 per cent. of 21 patients whom he treated by internal remedies for a considerable time before operating. He concludes that every patient with appendicitis should first be treated with internal remedies. Fortunately, neither this sentiment nor these statistics are fair representatives of the best German practice.

The mortality after operations for appendicitis has been often spoken of; but for the sake of comparison it may be stated that in a recent number of the *Journal of the American Medical Association*[1] several American surgeons reported large series of acute cases with an operative mortality of 5 per cent. or less.

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[1] Lancet, 1905, i. p. 1.

[2] New York Medical Record, 1904, vol. lxv. p. 685.

[3] Arch. klin. Chir., 1904, vol. lxxiii. p. 302.

Syms[2] begs the physicians who have charge of patients suffering with appendicitis not to fritter away the patient's chances of recovery by delay. "When one comes to a patient who can evidently withstand the operation, but in whom the chances of recovery seem to be but the slightest, one is confronted with perhaps the most difficult question which presents itself in surgery; that is to say, whether to operate or not. But from the patient's point of view, the slight chance of recovery by operation is the only chance he has; and it certainly seems that the question becomes a moral one, and that the patient is entitled to this one chance, and that the surgeon should not shirk the responsibility. But we always look with longing and regret to those precious hours which have been lost by delay, and to that period that has existed in every patient's case when he might have been operated upon with no fear of a fatal result. . . . . At the Lebanon Hospital we are constantly admitting patients who are in a precarious condition, owing to the fact that their physicians have kept them from operation day after day, apparently not recognizing the gravity of the case."

Prenatal Appendicitis (?). Examination of the appendix in the newborn as well as in adults who have never complained of symptoms due to inflammation in the cæcal region, shows a great variation in its position, in its relation to the cæcum, and in the extent to which it is covered with peritoneum. These facts are well known. Such a book as Huntington's *Comparative Anatomy of the Peritoneum and Abdominal Cavity*[3] illustrates profusely and describes a dozen ways in which the appendix can develop so that it shall not have a complete mesoappendix. Yet when a surgeon finds an appendix more or less bound down by peritoneum he is apt to forget that such conditions may be developmental. The writer recently removed the appendix from a young man who gave a very indefinite history of pain in the right side, but no acute attacks of inflammation. The appendix was about six inches long, extended outward and slightly upward for one-half of its length, and then bent sharply and reached back to the starting point, so that its tip and stump were close together and the whole appendix formed a slim U. It was completely covered by the posterior layer of peritoneum so that there was no mesoappendix whatever. The bloodvessels entered the appendix from its lower and posterior aspects. The peritoneum which covered the appendix was of the same appearance and texture as the other normal peritoneum exposed by the operation. This was in my judgment a marked instance of developmental "adhesions"—if one must use a word which to the surgeon signifies previous inflammation. When, therefore, Jackson[1] presents a case of "prenatal appendicitis" we are justified in asking for some other ground for the diagnosis than the "adhesions" between the appendix and cæcum. It is true that the appendix was congested, but as the child died when two days old of a large dose of bichloride of mercury, the congestion may well have been caused by the metallic poison. The accompanying illustration (Fig. 31) is from a photograph of the appendix, cæcum, and ileum.

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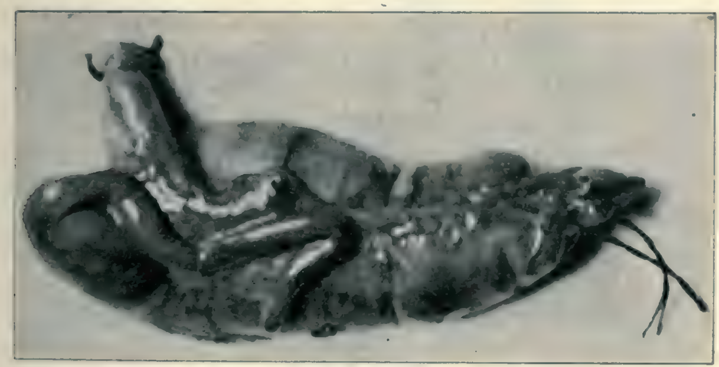
[1] Journal of the American Medical Association, 1904, vol. xliii. No. 13.

[2] Annals of Surgery, 1904, vol. xl. p. 727.

[3] Philadelphia, 1903.

An Inverted Appendix. The appendix has been found inverted into the cæcal cavity, and when so inverted it may give rise to severe symptoms of chronic appendicitis. This unusual case is reported by Brewer.[2] The patient was a woman aged twenty-two years, operated upon during an acute attack of appendicitis. The appendix was not found. There was plastic peritonitis but no abscess. The patient recovered from the operation but suffered so much from pain, indigestion, etc., that the abdomen was reopened some weeks later, and the cæcum more thoroughly freed and examined. No appendix was present external to it, but a mass could be felt within its lumen. The cæcum was incised, and the condition of things represented in Fig. 32 was discovered—viz., the appendix inverted for nearly the whole of its length, and presenting signs of old and recent inflammation. Brewer is unable to say whether the condition was congenital, representing an error of development, or acquired in the nature of an intussusception of the appendix.

FIG. 31.



Complications of Appendicitis. Though the possibility of *prerectal abscess* as a complication of appendicitis has often been referred to, and although rectal examination has repeatedly been urged as a routine procedure before deciding on the treatment of appendicitis, the advice is often neglected. In consequence an abscess may pass unnoticed to give trouble at the time or weeks later. Owen[1] mentions an instance of the latter type. A man aged forty-five years was seized with an attack of abdominal pain chiefly centred in the hypogastric region, and so severe that he made a diagnosis of appendicitis. He consulted a physician, who finding his right iliac region free from tenderness, assured him that he was suffering from the after-effects of influenza. Hot fomentations were applied and the patient's condition improved; but for three months he suffered from more or less pain and fulness at the neck of the bladder and from difficulty in defecation. At last a rectal examination was made and a mass easily detected in front of the rectum above the prostate gland. The patient was referred to Owen, who made a median abdominal incision and opened the abscess cavity, in the right side of which was the tip of an inflamed appendix. The cavity was drained through the abdominal wound, and the patient made a slow but complete recovery.

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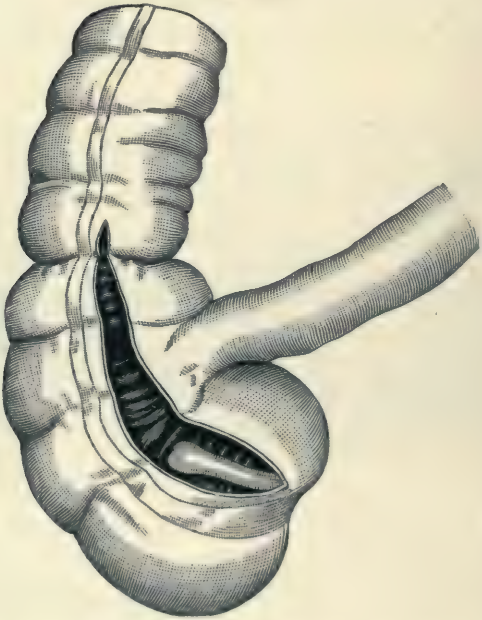
[1] American Journal of the Medical Sciences, 1904, vol. cxxvii. p. 710.

[2] American Medicine, 1905, vol. ix. p. 67.

FIG. 32.



Appendix and Ovary. Craig[2] denies that there is a connection anatomically and pathologically between the appendix and ovary. The use of the term appendiculo-ovarian ligament is therefore an unfortunate one, but like many others having once found its way into medical literature it probably will not be given up. Clado suggested the name which was emphasized later by Durand, under the mistaken notion that the right suspensory ligament of the ovary "takes its origin" from the meso-appendix, or the peritoneum about the cæcum or lower end of the ileum. This is an anatomical error, since the ligament represents the path followed by the ovary in its descent from the Wolffian body; so that if it can be said to arise anywhere, it is from the phrenic ligament of the kidney. If it seems to originate in the peritoneal folds about the appendix, it is only because the structures happen to lie together; and any lymphatic connection between the appendix and right ovary is merely an anastomosis, as the structures are of totally different origin.

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[1] Medical Press and Circular, 1904, vol. i. p. 165.

[2] Journal of the American Medical Association, 1904, vol. xliii. p. 1438.

This view is also in accord with the clinical observations. Only a few cases have been observed in which inflammation has actually proceeded from the appendix to the ovary or in the reverse direction; while many men have been misled in their diagnosis by the presence of a tenderness starting high up in the iliac region and extending down into the pelvis which they have attributed to appendicitis. The swelling of the extrapelvic portion of the suspensory ligament may even be felt before operation if careful palpation is made. Craig mentions 5 cases in which the extrapelvic portion of the ligament was inflamed in connection with ovarian disease, and in none of which was the appendix involved except as the dragging of the swollen ligament sometimes produced a curvature of the organ. The treatment followed was the excision of a V-shaped piece of the ligament, besides the appropriate treatment of the diseased ovary. The appendix when normal was not interfered with.

The permanent recovery of these patients showed that the appendix was in no way at fault.

Anatomically the left suspensory ligament would seem just as subject to inflammation as the right, but as far as known no instance of this has yet been reported.

The most important complication of appendicitis—peritonitis—is discussed under the heading "Inflammation of the Peritoneal Cavity."

Tumors of the Appendix. Kelly[1] states that there are 49 cases of carcinoma of the appendix on record, including 2 cases of endothelioma and 5 cases of primary sarcoma. To these he adds the records of 3 cases of carcinoma and 1 of sarcoma, making 58 cases of malignant disease of this organ. Some of these were discovered after removal of the organ and some at autopsy. Fig. 33 gives a good idea of the appear-

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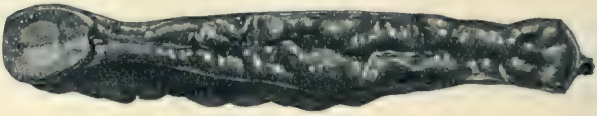
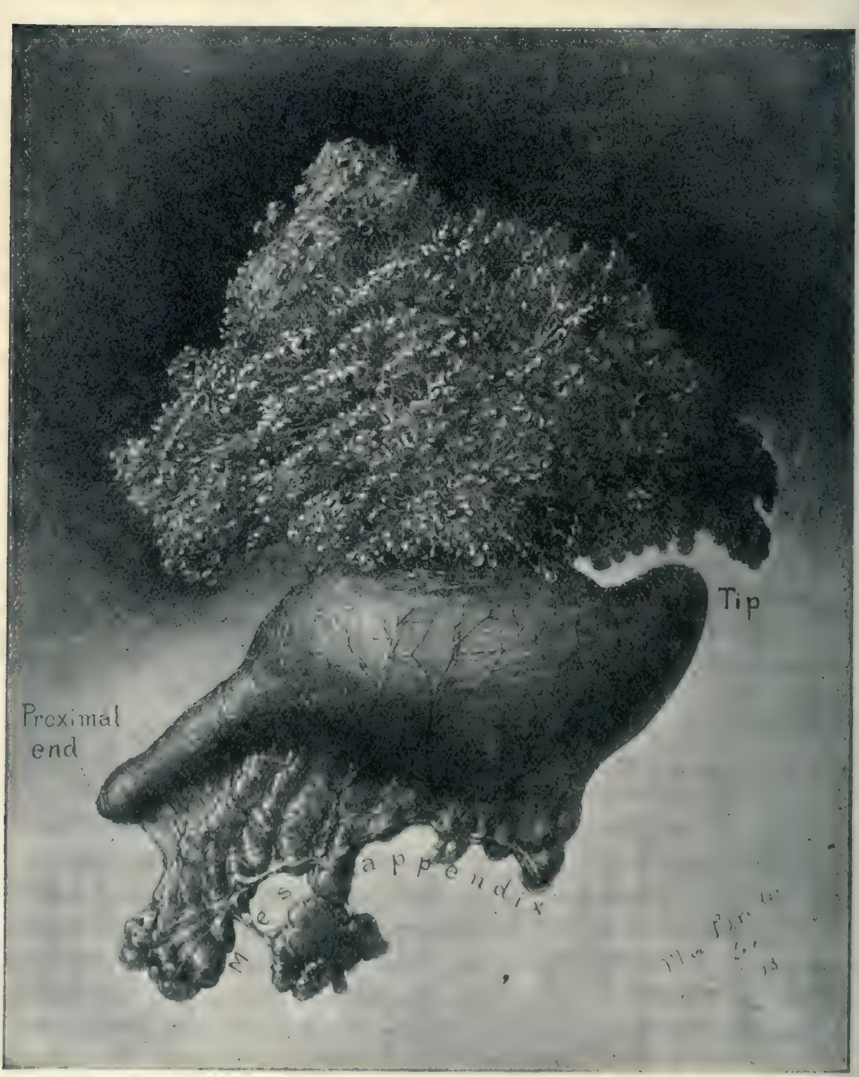
[1] Kelly and Hurdon. Vermiform Appendix, 1905.

FIG. 33.



McBurney's case of primary carcinoma of the tip of the appendix. There is a slight constriction proximal to the growth and the mucosa is somewhat swollen and hyperæmic. (Museum, N. Y., No. 2020.)

FIG. 34



Colloid carcinoma of the appendix, discovered at autopsy. (From A Elting, Albany, N Y.)

ances in the former class of cases, while Fig. 34 shows an advanced case of colloid carcinoma found at autopsy. The symptoms of malignant disease of the appendix are those of chronic appendicitis in the early stages. Perforation may result, or there may be no symptoms till the growth of metastases gives the usual symptoms due to them.

THE PERITONEAL CAVITY.

Penetrating Wounds. Harris[1] reports 16 operations for penetrating wounds of the abdomen with 3 deaths. One patient died from hemorrhage so profuse that it was not controlled in time to save life. Another patient who died had complicating injuries of both lungs and the spinal cord; and the third had eight intestinal perforations in the small intestine, transverse and sigmoid colon. Two patients were operated upon, but no hemorrhage or intestinal perforation was found. They both recovered. There were then three unsuccessful operations upon patients who would certainly have died without operation; two unnecessary but successful operations upon patients who would have recovered without operation; and eleven successful operations upon patients most of whom would certainly have died without operation. Could there be a stronger answer to those who counsel delay in these cases? Others advise operation in every penetrating wound due to a bullet, and delay in stab wounds. The fallacy of this advice is also shown by these cases, for the 2 in which no intestinal organs were injured were both cases of gunshot wounds, while there were six instances of stab wounds and wounds due to flying glass, and in 5 of these cases the intestine was wounded and in the other an omental artery was severed and was still bleeding at operation. But to obtain such good results it is necessary to operate early. In all but one of these cases operation was performed within three hours of the injury. Harris emphasizes these points:

1. In penetrating wounds of the abdomen there are absolutely no known symptoms which indicate injury to any of the viscera except hæmatemesis, hæmaturia, or the occasional passage of blood per rectum.
2. Except those relating to general shock, all symptoms following such wounds indicate either internal hemorrhage or peritonitis.
3. To wait for symptoms of perforation of the intestine means to wait until peritonitis has developed; therefore
4. Every bullet or stab wound which penetrates the abdominal cavity should be operated on at the earliest possible moment in order to anticipate the advent of peritonitis.
5. No time should be wasted in attempting to demonstrate the presence or absence of intestinal perforation by such means as the rectal

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[1] Annals of Surgery, 1904, vol. xxxix. p. 356.

insufflation by gases or vapors, or the analysis of re-collected intraperitoneally injected air or liquids.

6. It is essential to systematically examine the entire gastrointestinal canal in all cases regardless of the point of entrance of the wounding body.

7. Whenever the alimentary canal has been perforated, suitable drains (the author prefers the so-called cigarette drains) should be placed either through the operative incisions or counterincisions as may appear best suited to the individual case.

Long[1] holds similar views. His advice is to consider all abdominal wounds as penetrating till the contrary is proved by exploration; and to consider all penetrating wounds as having injured the viscera until careful inspection during a laparotomy has shown them uninjured.

Wounds of the Diaphragm. Wounds of the diaphragm frequently lead to hernia. Kaggs[2] was able to find recorded no less than 63 cases in which a portion of the stomach was involved in a *diaphragmatic hernia,* which he divides into congenital (24 cases, 15 of them discovered in persons between six weeks and sixty years of age); traumatic (21 cases); and acquired (12 cases, in 8 of which the protrusion of the stomach was determined by the œsophageal opening). The traumatic cases have perhaps the greatest surgical interest. Seven were due to stab or bullet wounds, 8 to crushes and 6 to falls. The aperture in the diaphragm was more frequently in the tendinous than in the muscular portions of the diaphragm, and rarely near the muscular attachments to the ribs. The diaphragmatic wound was never fatal *per se,* and if the patient survived other injuries, the rent became a well-defined aperture, with smooth edges, and often there were adhesions in its neighborhood between adjacent parts. About one-fourth of the patients referred to in this paper died from obstruction or torsion of the stomach, 1 from perforation of the organ, 1 from tetany, and 3 with symptoms suggesting pressure upon the heart.

Non-perforating Injury. It is interesting to note that the abdominal muscles may be ruptured without serious injury of the skin or abdominal viscera. Eisendrath[3] reports such a case—certainly an unusual one, as he has been unable to find any similar report of an injury which did not prove fatal. His patient, aged fifty years, was caught between two street cars passing on tracks close together. Three hours later the patient was suffering from shock and presented a resonant tumor above the right iliac crest, which was reducible with a gurgle. The clavicle and two ribs were broken. When the skin was divided it was seen that from the quadratus lumborum posteriorly to the middle of Poupart's ligament in front, every structure which is normally attached to the crest of the ilium and the outer half of Poupart's ligament, had been torn from its attachments. In the iliac fossa were many loose pieces of omentum, and the ascending colon was contused and dilated, but there were no other visceral injuries. The muscles were sewed to the gluteal fascia with fourteen mattress sutures of kangaroo tendon. A left-sided pneumothorax and a left-sided thrombophlebitis of the femoral vein delayed recovery somewhat. The scar of the extensive skin incision is shown in Fig. 35.

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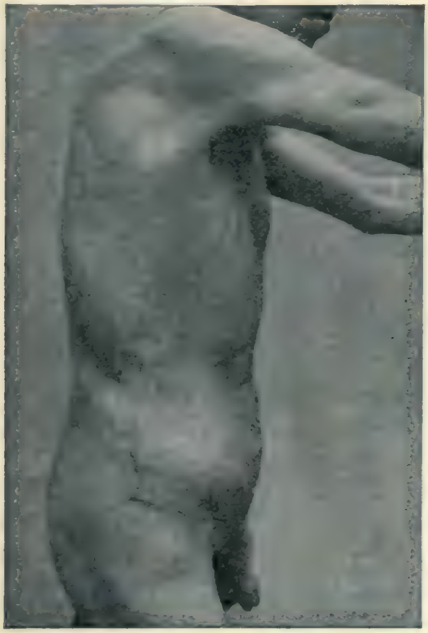
[1] American Medicine, 1904, vol. viii. p. 645.

[2] Lancet, 1904, ii. p. 358.

[3] Annals of Surgery, 1904, vol. xxxix. p. 979.

FIG. 35.



Cicatrix of incision made to expose subcutaneous laceration of abdominal muscles (EISENDRATH.)

Rupture of Abdominal Cicatrix. At the last French Congress of Surgery Reynier[1] reported 2 cases of rupture of the abdominal scar and eventration following removal of the sutures in eight or ten days after laparotomy. In 1 case he replaced the intestine and the patient died; in the other he covered the intestine with a compress smeared with vaselin and applied a rubber bandage. In this manner the protrusion was gradually overcome and the patient recovered. An operation for the hernia will, however, be necessary.

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[1] Revue de Chir., 1904, vol. xxx. p. 635.

Pozzi reported 6 such cases, all treated by immediate replacing of the intestine and suture with drainage. There was 1 death.

Roux experienced this accident three weeks after operation. The intestine was replaced after twelve hours and the patient recovered. He objects to the use of a continuous, suture or to the use of soluble sutures for closing abdominal wounds.

Bousquet has twice replaced intestines protruding from a reopened abdominal wound. Once the intestine was in the bed beyond the bandage. Both patients recovered.

Gourdet thinks the accident due to a faulty suture. He has never experienced it since he abandoned a through-and-through suture for one in three layers. He does not believe the immediate replacing of the intestine is absolutely without risk.

A New Abdominal Incision. Stimson[1] calls attention to an incision for opening the abdomen which minimizes the scar and tends to prevent ventral hernia, and which, though it has been employed and described by a few surgeons for some years, has not become generally known. The skin incision is a shallow curve concave upward extending across the median line 3 or 4 cm. (1 to 1.5 inches) above the symphysis pubis. The length is three or more inches. The aponeuroses of the external and internal oblique muscles are similarly divided, but not beyond the outer borders of the recti muscles. The central portion of this aponeurotic flap is freed with knife and fingers. It is then drawn sharply upward and the abdomen is opened by a longitudinal incision in the median line. The abdominal wall is sutured in three layers—viz., peritoneum, aponeurotic flap, and skin. The sutures of the aponeurosis are of chromic gut. Stimson leaves rubber-tissue drains under the flap for two days. The scars have been firm and relatively inconspicuous. In one case he reopened the abdomen after a few months and found that the aponeurotic flap was firmly united along the incision and also to tissue between the recti muscles. In no case has he seen any hernia following the incision.

To Prevent Postoperative Vomiting. White[2] has found *gastric lavage* an excellent preventive of postoperative vomiting. It is indicated in cases in which there has been insufficient time to properly prepare the patient; in cases in which the anæsthesia is continued for an hour or longer; in cases of short anæsthesia if the patient has suffered previous to operation from nausea and vomiting or chronic gastritis. It is contraindicated in operations upon the stomach and in young children. The tube should be introduced while the patient is still fully under the anæsthetic.

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[1] Annals of Surgery, 1904, vol. xl. p. 178.

[2] Ibid., p. 194.

Increase in Resisting Power of Peritoneum. Recognizing the impossibility of protecting the peritoneal cavity from all infective germs in operations in which the stomach or intestine is opened, Mikulicz has been experimenting to learn if there is any way of increasing the power of the peritoneum to dispose of such germs as are left within it in spite of the best operative technique. If this end can be accomplished, not only will the lives of some patients be saved, but others will avoid an unusually tedious convalescence. There have been many attempts to reach this end by producing an artificial hyperleukocytosis. More than ten years ago Loewy and Richter injected spermin and other albuminous substances into animals for this purpose. A hypoleukocytosis was first produced, but this was quickly followed by a hyperleukocytosis, and the blood of the animal was shown to have a greater bactericidal power in this later stage than at any other time. These experiments, however, have had no practical application to man.

In 1894 Issaeff accomplished a similar result with normal saline solution, bouillon, tuberculin, and nucleic acid, increasing the peritoneal resistance for cultures of cholera bacilli thirteen to seventeenfold in some instances. The phagocytosis was marked in two hours and in three hours no more microbes could be found in the exudate.

Salieri[1] in 1902 was able to increase the resisting power of the peritoneum sevenfold against coli bacilli sevenfold by the injection into the peritoneal cavity of small amounts of saline solution.

These experiments were made upon guinea-pigs, but the method was also employed three times upon man in doses of 30 to 60 c.c.

Recently, Miyake has made numerous experiments along the same line and has demonstrated that the peritoneal injection of nucleic acid, and even the subcutaneous injection will produce a marked hyperleukocytosis whose maximum is reached in about eight hours. He employed a 0.5 per cent. solution for the subcutaneous injection. Experiments showed that a guinea-pig thus treated had a peritoneal resistance sixteen to twenty times the normal against coli bacilli.

Encouraged by these results Mikulicz has employed similar injections administered to 34 patients. The 0.5 per cent. solution of nucleic acid was at first employed, and then stronger solutions. It was not found safe to increase the strength above 2 per cent. on account of nausea and vomiting. Fifty c.c. were injected subcutaneously beneath the breast. The injections were made from six to eighteen hours before operation. The injections produced a leukocytosis varying from 9600 to 25,800. It was not always possible to say whether the hyperleukocytosis had reached its highest point previous to operation or not. Few unpleasant symptoms were noted as a result of the injections. In one case only was there a chill; in two cases there was fever over 39° C. (102° F.).

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[1] Arch. klin. Chir., 1904, vol. lxxiii. p. 347.

Mikulicz says that it is yet too soon to judge of the exact worth of these injections in the human subject. One has no means of knowing what amount of infectious material the peritoneum has to contend with after an operation upon the alimentary canal. Experiments have shown that the subcutaneous injection of nucleic acid in animals produces hyperleukocytosis and increases their peritoneal resistance against infectious germs. In man it causes a hyperleukocytosis, and it is a fair inference that the peritoneal resistance is also increased. In his own practice Mikulicz always employs saline irrigation of the abdominal cavity after operations upon the alimentary canal, washing in and out with large quantities through two tubes, and leaving considerable fluid when closing the abdomen. This practice was not omitted in those cases in which the nucleic acid was injected. Both of these methods are supported by the results of experiments upon animals. The saline irrigation has already the sanction of many surgeons.

The nucleic acid employed (Hefenucleinsaure) was furnished by Böringer, of Mannheim, Germany.

In commenting upon this paper the *Lancet*[1] says: "While it is yet early to pronounce definitely on the value of this prophylactic hyperleukocytosis we have facts enough before us to declare that the outlook of the process is exceedingly hopeful. We are justified in expecting that the developments which the future will reveal will enable us to guard against risks of septic infection even in cases where those risks now appear to be greatest."

Mariani[2] has been testing the resisting power against infection of the peritoneum of rabbits. He finds that laparotomy and handling of the intestine reduce it; it returns after a period of rest. It is also reduced by cathartics and large doses of morphine, but is increased by small doses of morphine and by atropine.

Helmberger and Martina[3] seem to have shown by experiments on rabbits that bacteria can only penetrate the intestinal wall of this animal when all of the coats are severely injured. Of the different coats considered separately the muscular layers seem to oppose the greatest obstacle to the bacterial exit.

Inflammation of the Peritoneal Cavity. The treatment of general peritonitis is still a subject for active discussion and will doubtless remain so until the mortality is far less than it is now in the hands of most surgeons. The estimate of the mortality from this disease is

[1] Lancet, 1904, vol. ii. p. 30.

[2] Il Policlinico, 1904.

[3] Deut. Zeit. f. Chir., 1904, vol. lxxiv. p. 527.

peculiarly difficult on account of the indefinite way in which general peritonitis is assumed to be present.

Blake's definitions of the different forms of peritonitis were given in Progressive Medicine last year,[1] but they are so essential to the proper appreciation of his statistics and those of others that they are reprinted.

"I divide all cases of peritonitis into two main groups, localized and diffuse. The cases of localized peritonitis are those in which the products of inflammation are limited by adhesions, or, in other words, form an abscess. By diffuse peritonitis I mean an established progressive inflammation without definite limitations, evidenced by extensive redness of the peritoneum, a definite inflammatory exudate, a tendency to general involvement, and intestinal paralysis. These cases are conveniently subdivided into cases of spreading peritonitis, in which parts of the peritoneum can be demonstrated as free from the invasion; and general peritonitis, in which no part, possibly excepting the lesser sac, is uninvolved."

Blake operates as early as possible. He flushes the abdomen with large quantities of warm saline solution through a double current tube, to the outlet of which is attached a rubber tube so as to produce siphonage. He uses a cigarette drain which does not project more than half an inch into the peritoneal cavity. The after-treatment affords absolute rest for the alimentary canal and plenty of fluid for the vascular system. It is as follows: The stomach is washed out before the patient leaves the operating table, and no food is given per os until all tendency to nausea is past. When the general condition is very bad intravenous infusions are given; otherwise saline enemata or irrigations are employed. If nausea persists unduly, nutrient enemata are alternated with the saline enemata. If the patient is restless morphine is administered. When this treatment is thoroughly instituted postoperative paralysis of the intestine and distention are seldom to be feared. During the year previous to this report he operated upon 19 patients with diffuse peritonitis. There were 5 cases of general peritonitis with 2 deaths. One patient died from pneumonia, the necropsy showing that the peritonitis had resolved, leaving only one, a case of perforating gastric ulcer of forty-eight hours' duration, in which the death could be fairly attributed to the peritonitis *per se;* and 14 cases of spreading peritonitis, with 4 deaths, in 2 of which, as far as could be told by clinical evidence, the peritonitis had resolved, leaving 2 in which death was caused by a persistence of the process. This gives a total mortality of about 32 per cent. This is such an improvement upon that reported a few years ago in similar cases that Blake feels justified in predicting a lowering of the mortality to 20 per cent. in the near future.

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[1] Progressive Medicine, June, 1904, p. 36.

General Peritonitis. Hawkes[1] reports the treatment of 11 patients suffering from septic peritonitis following *appendicitis*—a treatment which was successful in all but 2 cases—mortality 18 per cent. Hawkes looks upon no case as hopeless unless the patient is in such a state that it can positively be said that he would die on the operating table. In order to save time the operator passes in mental review every step of the operation while preparations are being made; the anæsthesia (gas and ether) is given on the operating table, and is not commenced until all instruments, etc., are placed at hand. The patient lies in a dorsal position with the chest slightly elevated. The incision through the outer part of the right rectus muscle gives the best and quickest exposure. Two fingers are introduced into the right iliac region, and the appendix brought to view. Two hot pads wrung out of saline solution keep back the intestines and soak up pus. The mesoappendix is ligated with catgut and cut and the stump of appendix is ligated, cut, and cauterized. The diagnosis of general septic peritonitis is then made by passing successive fresh sponges (1) to the subhepatic and epigastric areas; (2) to the splenic area; (3) to the left iliac fossa; and (4) to the pelvis. Unless purulent fluid can be squeezed from each sponge when withdrawn the patient is not considered to have a *general peritonitis*. The 11 patients here mentioned had purulent material in all of these spaces. Next the patient's chest and upper abdomen are raised, and the abdominal cavity is irrigated through a large Chamberlain tube with several gallons of hot saline. This irrigation is begun in the upper abdomen and completed in the pelvis. As much fluid is left in the abdominal cavity as it will hold. From one to two ounces of magnesium sulphate dissolved in hot water is then injected into as high a loop of small intestine as is readily obtainable. The needle is passed obliquely through the intestinal wall, and after its withdrawal the puncture is closed with a catgut stitch. Two "cigarette" gauze drains are used—a large one reaching to the pelvis and a small one to the appendicular stump. The anæsthetic is stopped and the abdominal wall is sutured in a single layer, or if time permits in three. The patient is placed in a bed the head of which is raised sixteen inches above the foot. At the end of twenty-four or thirty-six hours the pelvic drain is no longer needed and is removed. These patients need free stimulation. The injected magnesium sulphate usually gives a movement in twenty-four hours. If not small doses of calomel followed by salts and enemata are employed. No one of the 9 patients who recovered suffered from abdominal adhesions.

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[1] Report of Presbyterian Hospital, New York, 1904, vol. vi. p. 103.

The value of the *cigarette drains*—gauze wrapped in rubber tissue—is illustrated in the freedom from intestinal adhesions enjoyed by Hawkes' patients. Clinton[1] reports a case in which he flushed through both flanks and then drained with glass tubes wrapped with gauze (smooth on the inside and rough on the outside). Two subsequent operations were necessary, one for fecal fistula, one for adhesions.

In the address on "Surgery" at the 1904 session of the American Medical Association, Mayo[2] brought out in most forcible terms the necessity of operating early in *perforations of the upper abdomen.* He and his brother have performed 811 operations on the gall-bladder and biliary vessels. Four of these were for acute perforations of the gall-bladder, with 2 deaths, although the mortality in the non-perforative series was less than 5 per cent. There were 4 acute duodenal perforations, with 2 deaths; and 41 operations for non-perforative diseases, with only 1 death. There were 5 perforations of the stomach, with 2 deaths, and 1 operation for acute pancreatitis and fat necrosis, with recovery. This makes 14 operations for acute perforation, with a mortality of 50 per cent., and over 1150 operations for subacute and chronic benign lesions of the same organs, with a mortality of a little less than 5 per cent. If we add to this mortality of 50 per cent. in operations for acute perforation, the cases seen in a moribund condition beyond an attempt at relief, and the greater number in which death occurs without an ante-mortem diagnosis, we get some idea of the appalling nature of the disaster. To be successful, the operation must be immediate. The condition is as imperative as hemorrhage from an artery of the third class. Few patients recover if operated on later than ten hours after perforation.

Deaver[3] read a paper on the "Mortality of Appendicitis" at the 1904 meeting of the American Medical Association. In the lively discussion which followed, personal remarks were not altogether absent. As far as it possessed a scientific character, this discussion was chiefly devoted to the treatment of patients with peritonitis. Deaver stated in this paper that he does not operate on patients with general peritonitis of several days' duration, as they are very likely to die.

In the preceding five months he had operated upon 159 cases of acute appendicitis, with a mortality of 5 per cent. plus. In this list were included 16 cases of general peritonitis without a death. None of these patients had been ill more than a few hours. He did not state on what he based the diagnosis of general peritonitis.

La Place believes in irrigation with sterile water, which he considers less irritating to inflamed tissues than saline solution.

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[1] Buffalo Medical Journal, 1904, vol. xliii. p. 823.

[2] Journal American Medical Association, 1904, vol xlii. p. 1525

[3] Ibid., vol. xliii. p. 859.

Wathen said that it is better to avoid the irritation of flushing and sponging the peritoneal cavity. "Do not irrigate, do but little sponging, and drain from the lowest part of the cavity by a large gum tube. If the infection is virulently streptococcic, the patients will die under any treatment."

Ochsner reported the results in the treatment of 1000 cases of appendicitis. Among them were 117 cases of perforated appendix in which the infectious material was not circumscribed. Many of these patients seemed to be suffering from diffuse peritonitis when they entered the hospital. They had a bad facial expression, cold perspiration, distention of the abdomen, and contracted abdominal muscles, so that 78 of them were treated for a time by starvation, gastric lavage, and rectal feeding. Only 4 of the 117 died after operation. There were also 33 patients suffering from diffuse peritonitis when they entered the hospital. Seven were in such bad shape that they were not operated upon; 3 others died after operation, making a total of 10 deaths, or 30 per cent., in this class of cases. In this hospital no patient is refused admission because he is too sick.

Murphy reported 16 consecutive operations for general suppurative peritonitis, the result of perforations of the stomach, duodenum, intestine, and appendix, with only 1 death. Formerly patients were killed on the table because too much work was done in the abdomen at the time of severe toxæmia and severe depression. Pus retained under pressure is rapidly absorbed, whether it be in the peritoneal cavity or elsewhere, and to stop absorption, all that is necessary is to relieve the tension. There should be no washing, no sponging, no handling of the viscera. He puts a rubber drain in the rectovesical fold and places the patient in a semi-sitting posture.

Syms[1] is convinced that general peritonitis following appendicitis is necessarily a fatal condition. His method of dealing with these cases, when the disease is not walled in nor localized by adhesions, is to remove the diseased appendix and any gangrenous mesentery or omentum, to cleanse the local field with hydrogen peroxide, and to mop out the excessive excretion. He no longer resorts to flushing in any case, and he does not use widespread gauze packing in the abdomen, but attempts merely to thoroughly pack the original site of the disease in a way that will drain it.

He reports operating upon 19 patients in this condition by himself and his assistants, with 19 deaths. From this group is excluded all cases in which the peritonitis was considered more or less diffuse, but not general.

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[1] Annals of Surgery, 1904, vol xl. p. 727.

Posture after Operation. R. S. Fowler[1] reports 100 cases of well-marked septic peritonitis following *appendicitis* operated upon by G. R. Fowler and himself, with 67 per cent. of recoveries. The abdominal cavity was flushed and extensively drained, and the patient's shoulders were elevated not less than twelve inches. In 1900 G. R. Fowler[2] reported 9 successive cures of general peritonitis by flushing, drainage, and the elevated position, thus showing how unreliable may be an inference drawn from a small number of cases.

Küster[3] believes that the patient's chances are improved by turning him on his face for a few hours, so as to ensure perfect drainage of the peritoneal cavity. Experiments upon the cadaver show that substances, such as a solution of methyl blue, injected into the various pouches of the peritoneal cavity will all drain outward in a few minutes if the body is turned on its stomach, in case of a median incision, and a little to one side if the incision is a lateral one. The point is to so place the body that the incision shall be at the lowest point of the peritoneal sac. Whenever this is accomplished there is prompt drainage of all contained fluid. This position is borne by a patient with comparative comfort, if the chest and head are supported upon rather firm pillows, and the feet can be pressed firmly against the footboard. If necessary, the pelvis can also be raised above the level of the bed. There must, of course, be a sufficient opening in the abdominal wound to permit the escape of the contained fluid.

Küster reports 6 cases in which this position was employed, either immediately after the operation or at some time during the convalescence, to facilitate the escape of retained secretions. He also advocates the change of tampons and drainage-tubes in this position, so that retained secretions may freely escape. Four of the patients thus treated recovered, but the variety of their lesions, and the fact that in some of the cases the peritonitis was distinctly circumscribed, makes it inadvisable to record them as cures of general peritonitis. The 2 fatal cases are, on the other hand, not to be attributed to the position, as one of the patients died from pneumonia, and the other from rupture of the sigmoid colon, occurring five days after operation, through a partial rent in its wall.

Enterostomy in Peritonitis. Busch[4] gives a further report from Heidenhain's clinic of the good effects of enterostomy in peritonitis, which was advocated by Heidenhain before the Congress of German Surgeons in 1902. This treatment rests on the principle that neither cathartics nor nourishment can be given with benefit until the passage through the intestine is free. In certain cases in which the intestine is paralyzed by inflammation, enterostomy gives a free exit to the contents.

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[1] Medical News, 1904, vol. lxxxiv. p. 1011

[2] Medical Record, 1900, vol. lvii. p. 617.

[3] Arch. klin. Chir., 1904, vol. lxxiii. p. 1074.

[4] Deut. Zeit. f. Chir., 1904, vol. lxxiv. p. 215.

Gebhart[2] enthusiastically praises enterostomy as a preventive and cure of threatened or commencing general peritonitis, reporting 8 cases in which it was employed to relieve the ileus. Six of the patients recovered, and the fistulæ closed spontaneously. Two died, 1 from carcinoma, and 1 from many adhesions and obstructions which two subsequent operations failed to overcome. The relief of ileus due to such mechanical means is, of course, not quite the same as the ileus of paralysis in acute peritonitis.

Abdominal Abscess of Thoracic Origin. Williams[2] calls attention to the fact that abscesses at the base of the lung following *pneumonia* generally perforate downward into the abdominal cavity, while abdominal abscesses often perforate upward into a bronchus. Two cases are cited in illustration. In the first, a young man suffered from pneumonia and pleural effusion following influenza. Four pints of fluid were withdrawn by aspiration of the left side, and later two pints. The temperature continued high at night, with morning remissions, and operation was advised but refused. The patient lived three months from the beginning of his illness. Shortly before his death the abscess perforated into the abdomen, probably into the colon.

In the other case the patient became violently ill three days after a miscarriage, with high temperature, an offensive vaginal discharge, pelvic tenderness, abdominal distention, and a rounded swelling under the costal margin in the left midaxillary line. The dulness over this swelling was continued upward to the fifth rib. Three weeks later reddish pus was aspirated through a large needle inserted between the seventh and eighth ribs. A portion of the eighth rib was excised, the pulmonary tissue overlying the lung was cut through, and the abscess was drained. About ten ounces of offensive pus were evacuated, and the cavity drained. Recovery was slow but complete. In this case the visceral and costal layers of the pleura were not united, yet no empyema resulted.

Surgical Treatment of Ascites. Monprofit[3] enumerates the various operations for the relief of ascites due to *cirrhosis of the liver*. 1. Paracentesis. 2. Simple laparotomy. 3. Laparotomy with drainage. 4. Vaginal laparotomy. 5. Omentopexy or Talma's operation. 6. Porto-cava anastomosis or establishment of Eck's fistula. This last operation was transferred from experimental to clinical surgery by Vidal, who successfully divided the portal vein and implanted it into the side of the vena cava. The patient recovered from the operation, but died very suddenly four months later with symptoms of infection throughout the veins,

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[1] Deut. Zeit. f. Chir., 1904, vol. lxxiv. p. 20.

[2] British Medical Journal, 1904, vol. i. p. 8.

[3] Revue de Chir., 1904, vol. xxx. p. 600.

derived from the intestinal tract. There was a sudden chill, coma, and delirium, and death in twenty-four hours.

The operation of *omentopexy* has been uselessly modified and complicated by many surgeons. Its mortality varies with the condition of the individual. It may be stated as 15 per cent. in hypertrophic cirrhosis and 40 per cent. in atrophic cirrhosis. There would be fewer deaths if operation were always performed as soon as it is evident that medical means are inefficient, *i. e., at the commencement* of the ascites. In the list of operations hitherto reported (224), 70 are said to have resulted in a complete cure (35 per cent.).

Porto-cava anastomosis cannot replace omentopexy, but in certain cases it may be indicated. The risk of death from the direct entrance into the general circulation of substances absorbed from the intestines can be minimized by keeping the patient upon a diet of carbohydrates.

Jayle advocated a subumbilical incision in women, as the cause of the ascites may be found in some pelvic lesion instead of the liver.

Willems questioned Monprofit's statistics of cures, saying that a collection of cases made by a German author showed only 10 late cures in 250 cases. He also stated that ascites is held by some to be due to a toxic condition of the blood due to insufficient function of the liver. Should this theory prove correct, omentopexy would appear to be a useless operation.

Tuffier advised bacteriological examination of the ascitic fluid. In 1 of his cases it was tuberculous.

Delagénèire has been impressed favorably by temporary cholecystostomy with omentopexy and hepatopexy. He reported several successes. He looks upon cirrhosis of the liver as an infective trouble of intestinal origin.

Vidal thinks omentopexy is indicated as a relief of hemorrhage with ascites. The symptoms are due to portal hypertension, and can be relieved by Talma's operation.

Bardesco reported 6 cases, with 4 cures, after periods varying from fifteen to twenty-eight months. He operates as follows: General anæsthesia. Paracentesis. Median incision from umbilicus to ensiform. Removal of any fluid by sponging. Exposure of both recti muscles by incisions from within the peritoneal cavity parallel to the median line. Dissection with the finger of the anterior surface of each rectus muscle, forming a pocket, in which the free portion of the omentum is placed. Fixation of omentum by suture to the peritoneum at the edges of the three peritoneal wounds. Closure of the wounds.

ADRENALIN INJECTIONS FOR ASCITES. Barr[1] found the injection of 1 ounce of adrenalin chloride solution, 1:1000, a valuable preventive of reaccumulation of pleuritic effusion after tapping. He extended this treatment to the abdomen, injecting 3 drachms after tapping for ascites. If the ascites is due to a mechanical obstruction, the adrenalin has little or no effect; but the results in tuberculous and some other forms of ascites warrant a further trial. At the present time Barr combines the adrenalin injection with the injection of 4 pints of sterilized air into the peritoneal cavity, hoping thereby to prevent the formation of adhesions.

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[1] British Medical Journal, 1904, vol. i. p. 649.

FATAL TAPPING IN A CASE OF MALIGNANT ASCITES. A case of *intestinal puncture* during paracentesis is reported by Gwyn.[1] Ascites due to malignant disease in the abdomen was relieved by the withdrawal of eleven quarts of dark fluid. Blood flowed from the wound at the close of the paracentesis. One month later twelve quarts of bloody fluid were removed, with relief to the patient. Ten days later six quarts of fluid were removed, and just before removing the cannula some gelatinous and granular material escaped, found on microscopic examination to consist of masses of tumor tissue, intestinal material, starch, and meat and vegetable fibres, proving that the intestine had been punctured. In six hours there was collapse, followed by symptoms of peritonitis, and death in three days. The paracentesis was performed by a surgeon at a point below the umbilicus in the median line. The skin was cocainized and incised before the trocar was inserted. The patient experienced little pain.

Can the Vena Cava Be Ligated? In 1892 Mackintosh[2] reported a case of *thrombosis of the vena cava* complicating typhoid fever, in which the patient recovered. This was said by Keen,[3] writing six years later, to be the only recovery on record. Some of those to whom Mackintosh showed the patient after recovery questioned his diagnosis, saying that perhaps both internal iliacs were involved. The flow of blood was accomplished by enlargement of the internal mammary, superficial epigastric, external pudic, internal saphenous, and circumflex iliac veins of both sides. The vitality of the legs was at no time in danger, though œdema was great and persisted for a long time.

In a case reported by Huey,[4] swelling of the right leg came on about five weeks from the onset of an attack of enteric fever, and that of the left leg a few days later. The circulation was so poor in the left leg that amputation was considered, but was postponed on account of the feeble condition of the patient. Soon after the superficial abdominal veins began to swell, and the circulation in both legs improved. The condition a year later is shown by the accompanying illustration (Fig. 36).

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[1] American Journal of the Medical Sciences, 1904, vol. cxxvii. p. 593.

[2] Glasgow Medical Journal, 1892, vol. xxviii.

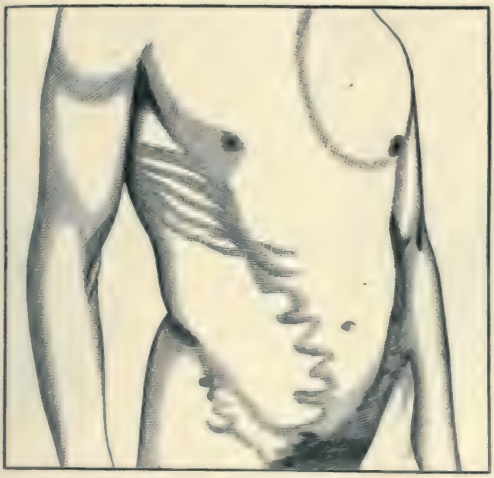
[3] Surgical Complications, etc., of Typhoid, 1898, p. 68.

[4] Journal of Royal Army Medical Corps, 1904, vol. ii. p. 593.

This case has a bearing on the possibility of successful ligation of the vena cava.

Aneurysm of the Abdominal Aorta. An interesting case of abdominal injury is reported by Brentano.[1] A man aged twenty-five years was shot in the ninth left intercostal space. He presented mild symptoms of shock and the abdomen was opened. There was a small retroperitoneal hæmatoma, but no organs were injured. The patient did fairly well until the seventh day, when he died rather suddenly. Autopsy showed that the bullet had passed clear through the aorta just above the renal arteries. The hemorrhage had been limited for several days, but finally burst through into the peritoneal cavity with sudden fatal results. In such a case as this suture might have been employed, or the method of plaster strapping suggested by Brewer,[2] and tested upon animals. He found that hemorrhage from a large vessel can readily be controlled by wrapping around it a thin, very adhesive sterile rubber plaster, much as an electrician wraps an exposed wire with rubber tape.

FIG. 36.



Dilated and tortuous superficial veins, the result of thrombosis of the vena cava. (HUEY.)

Reinsholm[3] has described a method of invagination and suture which he has used with success on the carotid of large animals and believes might be employed with success upon the human aorta. There are four steps in the operation: 1. The proximal end of the divided vessel is shaved down to the shape of a slim truncated cone. 2. A thread with a needle on each end is passed transversely through it. The two needles are then passed from the lumen outward through the wall of the distal end of the vessel. They should emerge exactly opposite each other. 3. The mouth of the distal end is held open while by means of the traction thread the proximal end is invaginated into it. 4. Superficial catgut sutures are inserted through the adventitia of both vessels, and the traction thread is cut off and withdrawn.

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[1] Centralblatt für Chirurgie, 1904, Beilage, p. 51.

[2] Annals of Surgery, 1904, vol. xl. p. 856.

[3] Nord. Med. Ark., 1903, AFD I, N:R. 3, p. 103.

Retroperitoneal Tumors. SARCOMA. Steele[1] has written a review of 96 cases of retroperitoneal sarcoma, including 5 cases from his own experience. The prognosis in these cases is hopeless except when the tumor can be removed, and is even then gloomy enough. The practical point of interest is naturally the possibility of an early diagnosis before metastasis has occurred, and before the tumor has assumed such a size that the patient cannot survive the loss of blood attendant on its removal. Steele says the diagnosis cannot be made until the tumor can be felt.

FIG. 37.

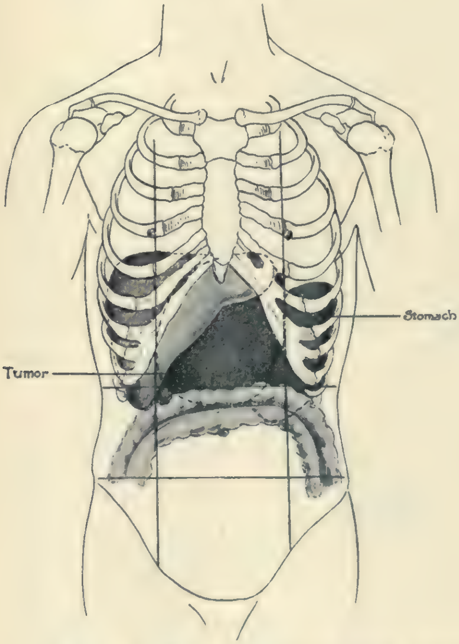

FIG. 38.

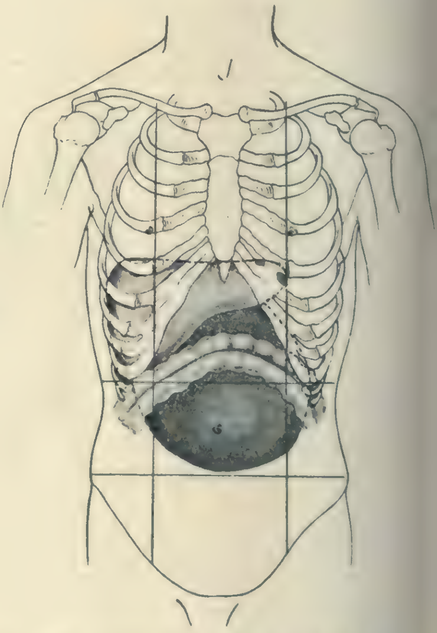

FIG. 37.—Case I. Retroperitoneal sarcoma. The transverse colon is pushed forward and crosses the anterior lower half of the tumor. The stomach is pushed forward and to the left. Compare Fig. 40. (STEELE.)

FIG. 38.—Case III. Retroperitoneal sarcoma. The colon is pushed forward, but crosses the upper half of the tumor instead of the lower half, as is usual in upper central retroperitoneal tumors. (STEELE.)

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[1] American Journal of the Medical Sciences, 1904, vol. cxxvii. p. 939.

As the symptoms are due to pressure, they vary with the situation of the tumor. If it is in the upper central region, or right or left upper quadrant, there are gastric disturbances—pain and nausea after eating and later vomiting. If the tumor is in the lower half of the abdomen the symptoms are more pronounced. In either lower quadrant there is œdema and pain of the corresponding foot and leg. If in the pelvic region there is disturbed micturition, frequent at first, and later frequency and almost obstruction of micturition from pressure on the bladder. The relations of the stomach and colon to the tumor is one of the most important diagnostic points; and yet a comparison of Figs. 37, 38, 39, and 40, all drawn from actual cases, shows with what care the results of such investigation must be considered.

Fig. 39.

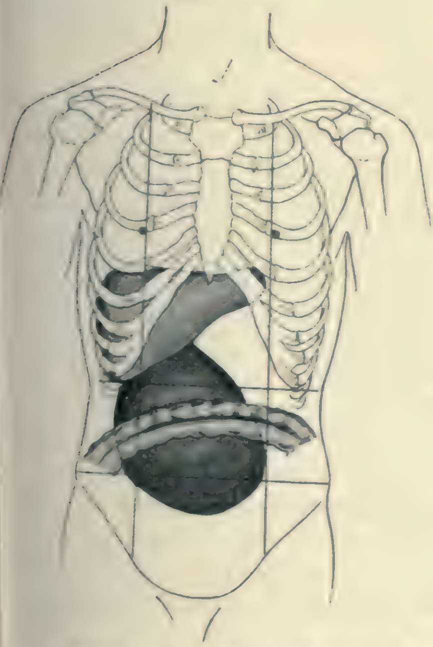

Fig. 40.

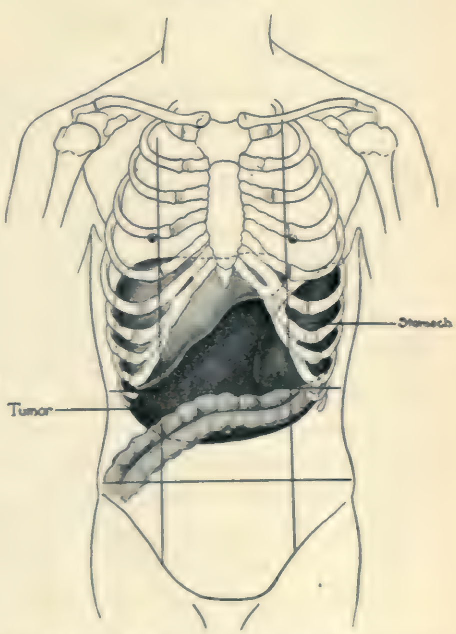

Fig. 39.—Case VI. Carcinoma of the right kidney. The colon is pushed forward and crosses the anterior surface of the tumor (Steele.)

Fig. 40.—Case VII. Aneurysm of the abdominal aorta. The colon is pushed forward and crosses the anterior and lower half of the tumor. The stomach is pushed forward and to the left. Compare Fig. 38. (Steele.)

The tumor is at first immovable, hard, and elastic, but is prone to undergo degeneration, and it is then soft and fluctuating in spots. By this it may be distinguished from other solid tumors of the retroperitoneal space.

Suprarenal Glands. Tumors of the suprarenal are rarely seen by the surgeon, and it is no wonder that operators are not agreed as to the best incision for their removal. Wendel[1] has collected from literature reports of 23 operations for such tumors, 18 of which were positively malignant and 2 others probably malignant. In 6 cases the tumor was attacked through the lumbar incision. Four of these patients died from the effects of the operation, and the other 2 in a short time from a continuance of the growth. The transperitoneal operation was performed 17 times with 7 deaths. Four of the survivors died from extension of the growth, but the remaining 6 were free from recurrence at the time of report. Wendel therefore concludes that the transperitoneal operation is less dangerous than the lumbar, and that it gives the surgeon a better chance to remove the whole of the neoplasm without the sacrifice of the kidney, should this be found to be unaffected by the disease.

This view has not been held by all surgeons. Thus Schede says that the lumbar incision is the incision of the future for the removal of suprarenal tumors just as it is now generally recognized as the incision of choice for renal tumors. Wendel holds that the conditions in case of a renal tumor are quite different. The urinary symptoms, accessibility to palpation, cryoscopy, ureteral catheterization, all enable the surgeon to make an early diagnosis and to know before operation the condition of the other kidney. Furthermore, the kidney itself is so large that a tumor within it can reach a considerable size before it extends beyond the limits of the renal capsule. In the case of a suprarenal tumor the diagnosis can rarely be made before operation, and the transperitoneal operation, while giving the operator a better chance to make a correct diagnosis, is also a less dangerous method of removing the tumor should it prove to be one of the suprarenal. If on account of a mistaken diagnosis, or for any other reason, a lumbar incision should be found to be preferable, the abdominal incision can be closed and the lumbar one made.

THE LIVER.

Control of Hepatic Hemorrhage. Tricomi[2] discusses the various methods of controlling hemorrhage in wounds of the liver, no one of which he thinks is applicable to all cases. Simple suture, for example, acts satisfactorily in superficial wounds, but it is of no avail in gunshot or other deep wounds. In such wounds tamponade is indicated. The use of *suprarenal extracts* he warmly commends. Experiments upon animals showed him that a single application will sometimes control bleeding, while subsequent dilatation of the vessels and secondary hemorrhage is not to be feared. There is some reaction of this character, but it rarely leads to serious hemorrhage, apparently because the primary contraction due to the suprarenal extract lasts long enough to favor the formation of firm thrombi.

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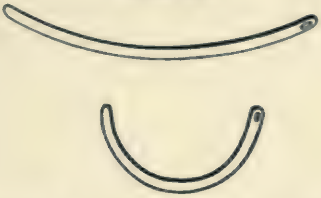
[1] Arch. klin. Chir., 1904, vol. lxxiii p. 998.

[2] Gaz. degli ospedali, etc., 1904, vol. xxv. p. 259.

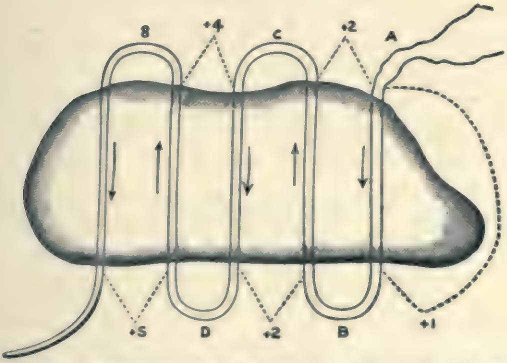
Partial resection of the liver and the best means of controlling hemorrhage are considered at length by Anschütz[1] in a valuable article, in which he gives brief accounts of almost 100 cases. His conclusions are as follows: The control of hemorrhage after resection is applicable only to small wounds of the liver. In resecting large portions measures to prevent hemorrhage should first be employed, and in most cases the resection should be made dependent upon their success. Compression of the portal vein may help in an emergency, even though it merely lessens the flow of blood. An elastic ligature around the liver is also a temporary measure not to be kept up very long. By far the most reliable method of preventing hemorrhage in extensive resection is the insertion of deep intrahepatic mass ligatures. These must naturally be drawn tight in order to compress the tissue. Figs. 41 and 42 give

FIG. 41.



Kusnezoff and Pensky's hepatic needles.

FIG. 42.



Intrahepatic ligatures of Kusnezoff and Pensky. A long double thread is employed. The threads are cut and tied alternately above and below the liver, as shown by the dotted lines. In this manner all the tissue is included in the ligature.

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[1] Volkmann's Klin. Vörtrag., 1903.

an idea of the blunt needles employed and the manner of their insertion. In lesser wounds one may trust to ligation and suture after the incision is made. Tamponade will usually control the hemorrhage after curettage. The cautery is useful to stop capillary bleeding. Hot air and steam are not recommended.

Recurrence of Hepatic Abscess. Schlayer[1] calls attention to the fact that a patient who has been operated upon with success in the tropics for an abscess of the liver may have a recurrence of his trouble after months of apparently sound health. The recurrence may follow some blow or strain, or it may develop without apparent cause. It is noticeable that the symptoms of a recurrence are by no means so violent as those of a primary acute abscess. There is a slight afternoon fever, perhaps up to 102.5°, but without chill. There is no icterus and the respiration is not embarrassed. The liver is only slightly tender. There is a slight leukocytosis, say of 10,000, which at times may reach 17,000. If there are no definite signs to indicate the position of the abscess, the incision should be made through the old scar.

Suppurative Cholangitis. The following remarkable series of operations is reported by Schelble:[2] A man aged sixty-one years had suffered for thirty-five years from infrequent attacks of biliary colic. Finally, after four weeks of ineffectual attempts to improve his condition by internal treatment, the abdomen was opened along the border of the right rectus. The liver was enlarged and congested and the omentum adherent to it. The adhesions were separated; the gall-bladder could not be found, the biliary passages seemed free from calculi, and the abdomen was closed. The irregular fever and chills and pain continued as before, so that four weeks later the abdomen was again opened and the liver incised after puncture for an abscess. A small amount of pus was obtained. The abscess cavity was drained and for two months the patient was improved. Return of his old symptoms led to another laparotomy, but repeated puncture and incision of the liver failed to reach pus. The wound was drained and on the following day discharged foul bile. Three weeks later as the fever continued the liver was for the fourth time exposed and divided transversely to drain the suppurative cholangitis now seen to exist. Fever continued, and pain and dulness on the left side seemed to indicate a subphrenic abscess. The syringe drew bloody serum and through an incision below the left costal margin 250 c.c. (half a pint) of this fluid was evacuated. The diaphragm was sutured to the upper margin of the wound before the abscess cavity was found. Five days later the patient in coughing incarcerated a right inguinal hernia. This was cured by operation, and at the same time an old hydrocele sac was found to contain pus and it was dissected away. Three weeks later a portion of the eighth rib was resected for empyema secondary to the subphrenic abscess, making seven major operations in seven months. The further convalescence was uneventful. The fever was all gone in a month, and the liver regained its normal size, though a small fistula was still present after four months. The pigmentation of the skin (not icterus) continued. The lung expanded promptly and the thoracic wound healed entirely.

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[1] Münch. med. Wochensch., 1904, vol. li, p. 343

[2] Ibid., p. 434.

Tuberculosis of the Liver. The excision of a tumor of the liver found on examination to be tuberculous is chronicled by Rome.[1] The tumor was in the right lobe and had caused adhesions between the liver and intestine, and the liver and the parietal wall. After these were freed it was seen that the removal of the tumor could be accomplished by cutting out a wedge from the margin of the liver. Catgut sutures were inserted before the excision was made, beginning at the apex of the triangle to be excised and passing through the thickness of the lobe. These were inserted about one-half inch apart and about one-half inch back from the line of incision. As soon as the excision was made the sutures were drawn up and tied. In this manner the hemorrhage was quickly controlled. The patient made a good recovery.

Hanbold[2] reports the removal of a tumor which in situation and on physical examination closely resembled the above, but on microscopic examination by several pathologists it was pronounced *sarcoma.* The growth was removed by blunt dissection. The normal liver tissue was torn through with a closed pair of scissors, and the trabeculæ of Glisson were clamped and tied before division. The venous hemorrhage was controlled by tamponade of gauze soaked in hot saline solution. Drainage was employed and the wound suppurated, but the ultimate recovery was good.

Syphilis of the Liver. Some surgeons believe that *gumma of the liver,* if recognized, should not be excised, but that the abdomen should be closed and the patient given antisyphilitic treatment. This is the view expressed by Anschütz,[3] but the diagnosis of a single gumma of the liver in a patient who perhaps has given no history of syphilis is such an uncertain one that this advice must often be overlooked.

Cyst of the Liver. Doran[4] was called to operate upon a woman suffering from deep jaundice and great enlargement of the liver. There were frequent semisolid white stools. An incision along the right rectus exposed a large cyst with semiopaque greenish-brown walls, from which two pints of bile were removed by aspiration. The cyst was situated in the quadrate lobe. Behind it were the gall-bladder, cystic, hepatic and common ducts, collapsed from pressure. The cyst was drained and the jaundice gradually disappeared. Bile was present in the stools from the third week, and the fistula narrowed until in seven months it was only two and one-half inches deep and discharged merely a little pus.

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[1] Annals of Surgery, 1904, vol. xxxix. p. 98

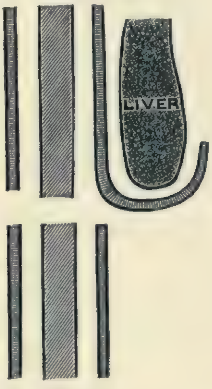
[2] Ibid., p. 240.

[3] Volkmann's Klin. Vörtrag., 1903, Nr. 356 and 357

[4] British Medical Journal, 1903, ii. p 1151.

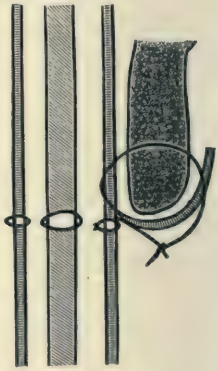
Doran mentions 6 other cases of simple cyst of the liver reported by Bird, Bayer, Winckler, North, Robson, and Miller.[1] The first three of these patients did not suffer from jaundice, nor cholelithiasis; the fourth and fifth had bile cysts, probably the result of obstruction by calculi while the bile cyst in the sixth patient—a child of three years—was probably of congenital origin. Doran believes that the cyst in his patient was of the same origin.

FIG. 43.



Support of the liver in a peritoneal pocket: 1, skin; 2, abdominal muscle; 3, peritoneum. (DEPAGE.)

FIG. 44.



Support of the liver Sutures inserted. (DEPAGE.)

Displacement of the Liver. Depage[2] has cured downward displacement of the liver, or *hepatoptosis*, by placing the patient in Trendelenburg's position, replacing the liver, making a six-inch incision parallel to and one inch below the free border of the ribs, and turning up the cut edge of peritoneum under the edge of the liver and suturing these structures in the manner shown in Figs. 43 and 44.

THE GALL-BLADDER AND BILE-DUCTS.

The Symptom Pain in Disease of the Gall-bladder. Bishop[3] reports some cases illustrative of the fact that attacks of colicky pain in the right hypochondrium do not always denote the presence of a calculus.

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[1] PROGRESSIVE MEDICINE, June, 1904, p. 112.

[2] Arch. klin. Chir., 1904, vol. lxxiii. p. 1081.

[3] British Medical Journal, 1904, i. p. 886.

These attacks are usually intermittent and often coincide with the passage of food from the stomach into the duodenum, that is, two or three hours after a meal.

Normally the gall-bladder is attached to the under surface of the liver by connective tissue, and by the peritoneal coat, which is reflected from the surface of the liver over the gall-bladder and keeps the two in contact, so that in most cases only the fundus is free. If for any cause congenital or acquired the gall-bladder has an unusual amount of motion the cystic duct may kink, producing an attack of colic, due to the unsuccessful attempts of the bladder to expel its contents. This at least is the theory of Krukenberg, and it seemed to explain the colic in one of Bishop's cases. At operation the gall-bladder was seen "full but not distended," was entirely free from the liver, hanging down behind the first portion of the duodenum, to which, however, it was not attached. The cystic duct, firmly attached, was bent at an angle. The bladder contained eighteen small facetted calculi. These were removed and the bladder lifted up and drained for nine days with a rubber tube. Recovery was perfect.

Paroxysmal pain may also be due to adhesions between the gall-bladder or liver, and the stomach, duodenum, colon, or omentum, no calculus being found at operation. Bishop assumes the sequence of events in these cases to be: 1. A mild attack of cholecystitis followed by the formation of a calculus. 2. Passage onward of this concretion, the irritation of its passage setting up some local peritonitis around the gall-bladder, and its consequent adhesion to the viscera around it. 3. Pressure upon or kinking of the cystic duct produced by the contraction of these adhesions. Three cases of this character are cited.

Preoperative Treatment for Gallstones. Decker[1] comments on the great frequency of gallstones which he has found present in more than 10 per cent. of all his necropsies during the past two years. The highest percentage reported to date was from Strassburg, where one-fourth of all cadavers over sixty years of age had gallstones. He says that the disposition to gallstones is often acquired at school but can be corrected by proper attention to gymnastic exercises and active games. It is well to remember that in fully one-half of the cases jaundice is absent, and that the first important symptom is pain in the region of the stomach, which is usually attributed to gastritis. When a patient complains of pain in this region the liver should be systematically examined, and if there is the least suspicion of gallstones the following treatment should be carried out morning and afternoon for three or four weeks. Six or eight glasses of hot Carlsbad water are taken at fifteen minutes' intervals early in the morning while the patient remains in bed. Hot applications are made to the hepatic region and a hot bath is given, to be followed by hot applications for another hour. This treatment is repeated in the afternoon. Deep breathing exercises are also helpful. Decker says that if the physician will make an early diagnosis, and put his patient through a course of this treatment for three or four weeks, he will usually be able to keep him out of the hands of the surgeon. The course of treatment should be repeated the following year.

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[1] Münch. med Wochenschr., 1904, vol. li., p. 1727.

Operative Treatment for Gallstones. Richardson[1] read a paper on diseases of the biliary tract before the Section on Surgery and Anatomy at the 1904 session of the American Medical Association. The paper confirms the principles that have for the past two years been made familiar to the readers of PROGRESSIVE MEDICINE through the reports of papers on this subject by the most advanced surgeons of the old and new worlds. Richardson's conclusions are:

1. Gallstones should be removed whenever they are known to exist, whether they offend or not, provided the patient's general and local conditions are favorable.

2. Drainage should be employed until the bile spontaneously ceases to flow through the wound.

3. Hernia in the scar is best prevented by a muscle-splitting incision, care being taken to avoid the motor ends of the intercostal nerves.

4. Biliary fistula meant a common duct obstructed usually by a gallstone, and it requires a second operation to close it, or a cholecystenterostomy.

Cholecystostomy or Cholecystectomy. Three years ago Moynihan[2] advocated removal of the gall-bladder in preference to cholecystotomy in conditions which make it certain or unlikely that the bladder can ever regain its function. Such conditions are severe injuries, gangrenous, or phlegmonous or membranous cholecystitis or chronic cholecystitis with great thickening of the walls of the bladder, distention due to obstructions of the cystic duct, ulcers, fistulæ, or malignant disease. Further experience with cholecystectomy has led him to advocate it in preference to cholecystotomy in almost all cases of gallstone disease. Its advantages are that the operation removes the chief source of the disease, that it thereby prevents in great measure a recurrence either of stones or of the inflammation which betokens their presence, that growths in the gall-bladder or adhesions around it are subsequently impossible, and finally, that the wound, if drainage is not required, may be caused to heal throughout by first intention. The gall-bladder is devoid of any strikingly useful purpose and its removal does not add to

[1] Journal of the American Medical Association, 1904, vol. xliii. p. 663.

[2] Lancet, 1904, ii. p. 1190.

the danger of the operation. If drainage of the ducts is necessary it can be carried out quite satisfactorily. The presence of a stone in the common duct does not prohibit the operation, but drainage of the duct, after removal of the stone in the duct or in the ampulla, is necessary. The one disadvantage that may justly be urged against cholecystectomy is this: that if a late operation should become necessary—for stones can and do form in the hepatic and common duct—such an operation would be more difficult and almost certainly more dangerous. The possibility of a further operation being necessary cannot be denied but the likelihood of it is negligible.

The operation of complete cholecystectomy is performed by Moynihan in the following manner: A vertical incision near the outer margin of the right rectus muscle is made and the muscle fibres are split. The usual length of this incision is five inches. If additional room be required it is best obtained by continuing the upper end of the incision along the costal margin upward and inward. All adhesions of the gall-bladder and ducts and liver having been cleared, the liver is rotated by gentle traction upon the gall-bladder until the cystic and common ducts are straightened and brought upon a level with the wound. By this manœuvre the operation is rendered simpler and quicker. The gall-bladder may now be removed from before backward or from behind forward. Moynihan now prefers to divide the cystic duct and to secure the cystic artery before freeing the gall-bladder. By dragging upon the gall-bladder the cystic duct is made clearly discernible. Its peritoneal investment is divided and stripped up along the duct toward the hepatic and common ducts, so that a cuff of peritoneum is raised up from the cystic duct. The latter is divided after securing it with a catgut ligature and the cystic artery is also defined and secured. The peritoneal cuff is then turned over the divided end of the duct and sutured. If it is intended to drain the common duct no ligature on the cystic duct is necessary. The cystic duct is cut off at its junction with the hepatic and common ducts and into the opening that is left a rubber drainage-tube is stitched. The gall-bladder is then stripped up from behind forward. The separation from the liver is readily effected by stripping up with the finger around which a thin strip of gauze is rolled. The peritoneum which passes from the liver to the gall-bladder is cut with scissors about three-quarters of an inch away from the liver, so that after removal of the gall-bladder the bared surface of the liver may be covered in by peritoneum. There is occasionally some bleeding from the denuded liver. This is readily checked by a suture or by the firm pressure of a hot swab or sponge. If the common duct is drained it is well to put in two other drains, one to the inner side of the duct toward the duodenum and one to the outer side toward the kidney pouch. These drains, whether of gauze or of rubber tubing, should be stitched in position by one or more sutures of catgut and they are left in eight to ten days. At the end of this time their removal is quite easy. It is necessary to stitch them in position in order to prevent their being moved away within a few hours on account of the constant movements of the liver during respiration.

Lilienthal[1] says of cholecystectomy:

1. While not absolutely ensuring a cure of cholelithiasis, it is the most radical procedure at our command.
2. The primary operation is far safer than the secondary.
3. Judging by my own experience in a sufficient number of cases to warrant an opinion, I believe that primary cholecystectomy is, on the whole, an operation at least as safe as appendectomy.

Report is given of 42 primary cases with only 1 death from sepsis, streptococcus inflammation of the gall-bladder being present at the time of operation. Five patients suffered from bronchopneumonia usually of the right lung, but recovered. In no less than 6 cases there was a recurrence of pain resembling colic, but in only 2 of these did jaundice recur. Two patients passed stones subsequent to operation.

The technique of operation as perfected by Lilienthal is as follows: An incision from two to four inches long splits the fibres of the upper portion of the right rectus. The peritoneum is incised and the gall-bladder brought to the wound. If it is tense it is aspirated, and then clamped or ligated to prevent leaking. A broad cross-piece on the table is then elevated about six inches. This apparatus takes the place of the sandbag and is a marked improvement. The gall-bladder is drawn firmly forward while its peritoneal coat is incised about half an inch from the liver and peeled off with scissors and fingers. When the bladder is free as far as the cystic duct this is clamped by an instrument the jaws of which are at a right angle to the handles, and a chromic gut or silk suture is passed through the cystic duct one-third of an inch beyond the clamp—*i. e.*, between the clamp and the common duct. The viscera are protected with gauze and the cystic duct is cut between clamp and ligature. The spurting cystic artery is caught and ligated. If the cystic duct is not patent it should be split up till bile flows from it, even if the incision is carried into the common duct. Any calculi there are removed and the ducts, if incised, are sutured, the cystic duct longitudinally, the common duct longitudinally or transversely if its lumen would be too much narrowed by a longitudinal suture. The cystic gut is next ligated and this ligature, together with the traction thread, passed through the cystic duct is left long and brought out of the wound. A small cigarette drain leads to the stump of the cystic duct. The liver is not sutured. The cross-bar of the table is lowered while the depths of the wound are exposed. The peritoneum and deep fascia are sutured and the skin approximated with sterile plaster. Lilienthal drained the ducts in only two of his 42 cases.

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[1] Annals of Surgery, 1904, vol. xl. p. 79

Transduodenal Choledochotomy. Kraske[1] says that he has had little success in trying to loosen a gallstone impacted in the lower end of the common duct so as to push it back into the more accessible upper portion of this duct. He prefers rather to draw the duodenum to the left and to cut down directly upon the stone. Yet this entails a serious risk if the stone lies in the diverticulum, for then the pancreatic juice may escape through the incision in the duct, erode the tissues, and kill the patient. This happened to one of his patients so that he now prefers to open the duodenum and incise upon the stone from within the duodenum if the stone is impacted in the papilla.

Kehr[2] has performed this last-mentioned operation twenty times with two deaths. He places great stress upon a careful suture and correct after-treatment (rectal feeding, etc.). Later he reported[3] 3 additional cases of transduodenal choledochotomy with a new step in technique which he calls sweeping out the common duct (choledochusfege). The operative steps in these cases were cystectomy, cysticotomy, incision of the supraduodenal portion of the common duct, duodenotomy, papillotomy, sweeping the common duct, drainage of the common duct, drainage of the hepatic duct. Time required, one hour to one hour and a half. After the duodenum and papilli were incised the stone or stones were extracted with forceps, and a fine clamp was passed from the duodenum through the common duct. Its jaws were then separated to seize a piece of gauze. This was withdrawn into the duodenum, sweeping out a number of small calculi which could not be seized by the forceps.

Removal of Gall-bladder for Chronic Empyema. Mellish[4] removed a cystic tumor containing pus situated retroperitoneally below the liver, and found on opening the cyst that it was a much thickened gall-bladder containing pus and two gallstones. The circumference of the mass was 35 cm. (fourteen inches). The patient had first noticed this tumor thirteen years previous after an attack of "peritonitis." After recovery from that attack the tumor never disappeared, but it gave her very little trouble.

Development of Carcinoma of the Gall-bladder. Knaggs[5] drained the gall-bladder of a woman aged sixty-nine after removing a calculus which was impacted in the cystic duct. The fistula became very small but did not entirely close for many months. When it did close the patient experienced so much pain that the gall-bladder was again opened and its mucous membrane stitched to the skin. After a few weeks of irregular fever the patient died. The gall-bladder was the seat of malignant disease, and there was a marked suppurative cholangitis of the liver. No other gallstones were found. The interest in the case lies in the fact that at the first operation seventeen months before death the gall-bladder and common and cystic ducts were palpated and no evidence of malignant disease was noticed. The previous attacks of pain from which the patient had suffered had not been accompanied by jaundice.

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[1] Centralblatt für Chirurgie, 1904, Beilage p. 105.

[2] Loc. cit., p. 107.

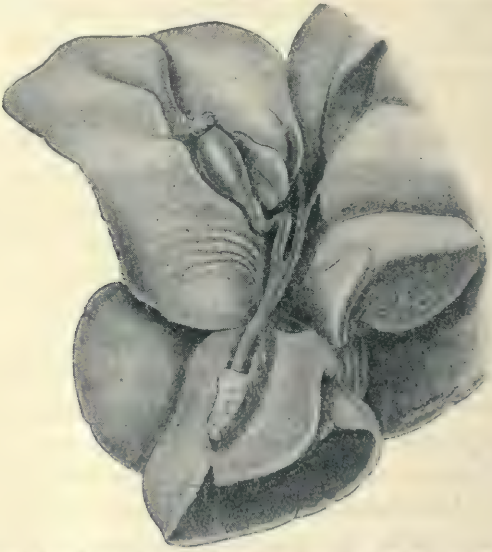
[3] Centralblatt für Chirurgie, 1904, p. 833.

[4] Annals of Surgery, 1904, vol. xxxix. p. 570.

[5] Lancet, 1904, i. p. 1054.

Results of Gallstone Operations. The fate of the stump of the cystic duct after cholecystectomy has occasioned some dispute. Some experimenters have claimed that a new gall-bladder may be formed from it, and others have stated that such a transformation is impossible. There have been few autopsy records to settle the question so far as man is concerned; but Haberer and Clairmont[1] seem to have definitely established the fate of the stump of the cystic duct in animals by an elaborate series of experiments performed upon dogs and cats. They found that a cystic duct ligated close to the gall-bladder may so dilate that one can with propriety speak of the formation of a new gall-bladder, since the dilated structure has all the features, muscular and mucous of the old bladder (Fig. 45). If the cystic duct be ligated, not at the gall-bladder,

FIG. 45.



Biliary passages of a dog, six months after ligation of the cystic duct close to the gall-bladder; gall-bladder removed. The cystic duct has dilated to form another gall-bladder. (HABERER and CLAIRMONT.)

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[1] Arch. klin. Chir., 1904, vol lxxiii. p. 679.

but near its termination in the common duct, such dilatation is impossible. The practical lesson is therefore that in performing cholecystectomy the surgeon should remove with the gall-bladder as much of the cystic duct as possible in order to prevent the formation of a new gall-bladder and the possible recurrence of the gallstones. There is abundant clinical testimony to the fact that gallstones do not usually recur after operation. Kehr says that the recurrence of pain after cholecystectomy is to be attributed to the pulling upon adhesions, to intestinal kinks, to abdominal hernia, or to conditions like enteroptosis or wandering kidney which existed prior to the operation.

Eugene Smith[1] found drainage of the gall-bladder a necessary sequel to operation in 90 per cent. of his 31 cases. Formerly gallstones were considered the cause of inflammatory troubles of the biliary tract, just as fecal concretions were formerly considered the cause of appendicitis. It is now well known that the concretions and the gallstones are the result of infection of the passages in which they are found. If cholecystitis is treated by early operation and drainage the infectious material can find its way outward, and the patient is saved the formation of gallstones, or other possibly more serious results, such as destruction of the gall-bladder, peritonitis, adhesions with neighboring organs, and interference with their functions (especially true of the pancreas), perforation of the gall-bladder, suppurative cholangitis or hepatic abscess. Cholecystostomy is the natural and easy method to drain the gall-bladder. If the cystic duct is constricted, or the gall-bladder is much distorted or has undergone malignant degeneration, cystectomy should be performed, accompanied by drainage of the cystic or common duct. This drainage may be omitted if there is a history of painful attacks due to stones but not accompanied with fever, and if at operation there is found neither marked infection of the biliary tract nor obstructive jaundice. Anastomosis between the gall-bladder and the intestine is permissible in cases of irreparable stricture of the common duct, or obstruction of the same due to malignant disease.

Intrahepatic Calculi. It is well known that Kehr is an earnest advocate of hepatic drainage after removal of the gall-bladder and incision of the common duct for calculi. He found that in no less than 17 per cent. of such cases there were some small calculi present in the discharge after what seemed at the time a perfect operation. He believes, therefore, that it is unwise to close the common duct and thereby to run the risk of retention of the calculi within the liver. Beer[2] has been investigating this question in the pathological laboratory, and finds good ground to endorse Kehr's clinical opinion. He selected 250 livers and examined them with reference to the presence of calculi. Although 72 of the gall-bladders contained calculi, calculi were found in the liver only six times. In 5 of these cases there was present at the time a closure of the common duct associated with cholangitis, and in the other case there was evidence of previous closure of an inflammatory nature. In 4 cases in which the common duct was closed by a tumor, there was accompanying cholangitis but no intrahepatic calculi. Beer therefore concludes that three factors are essential for the production of intrahepatic calculi: 1. Obstruction. 2. Cholangitis. 3. An unknown additional cause, since in the cases of obstruction due to tumor there was cholangitis but no calculi.

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[1] Journal of the American Medical Association, 1904, vol. xliii. p. 1492

[2] Arch. klin. Chir., 1904, vol. lxxiv. p. 115.

The rule should therefore be to drain the hepatic duct in all cases of calculi of the common duct when cholangitis exists. It should also be drained if the history of the patient shows that there have been attacks of cholangitis even if the bile at the time of operation is clear. For clear bile is not incompatible with cholangitis. Operation should not be delayed more than two months after the diagnosis is established of obstruction of the common duct due to stone. By adopting this plan one may occasionally find that the stone has passed into the duodenum, but early operation will save many patients from the serious effects of cholangitis.

LATE RESULTS OF OPERATION. Kehr[1] has recently published the condition of 350 patients operated upon by him for gallstones. 1. In 9 of these patients it was not possible to remove all the calculi. Three of these passed the calculi spontaneously and had no further symptoms. One was re-operated upon and the calculus removed. 2. One patient had at the time of report a mucous fistula; 1 a biliary fistula. 3. Eleven patients suffered from hernia—3 per cent.

In all of these cases the wound was left wide open and tamponed on account of suppuration. 4. Twelve patients suffered from colic due to adhesions; 5 from colic due to inflammation. This leaves 311 patients who reported themselves as quite well, or 89 per cent. This showing is even more favorable than the report Kehr made upon his first 400 operations for gallstones in 1900. In his total experience with 900 patients he has never seen a true recurrence of gallstones after operation.

Hepato-cholangio-enterostomy. Kehr[2] resected the gall-bladder of a woman whose common duct was surrounded by dense adhesions so that the bile flowed neither into the intestine nor into the gall-bladder. A mucous fistula and jaundice persisted, and five weeks later he exposed the lower edge of the liver and excised from it an elliptical piece 6 by 3 cm. (2.5 x 1 inch). Bile flowed from the opened bile-ducts. The duodenum was opened, applied and sutured to the wound in the liver. The wound healed well and the patient left the hospital in a month much improved and with less jaundice. Unfortunately no mention is made of the subsequent condition so that the ultimate effect of the operation is uncertain.

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[1] Münch. med. Wochenschr., 1904, vol. li. p. 602.

[2] Centralblatt für Chirurgie, 1904, p. 185

From experiments upon animals carried out by Enderlen and Tumstein[1] it seems extremely doubtful whether such an anastomosis can be established unless the operator is fortunate enough to open a large bile-duct. They found that the wound in the liver substance, exposed as it must be to the contents of the intestine with which anastomosis is made, became covered with a foul slough in three days. This gradually cleared away and repair of the wound took place. The deeper part filled up with granulations from the liver, while the intestinal epithelium covered the superficial wound. In this manner biliary discharge was completely prevented. These investigators do not therefore regard the operation as one of any possible utility, and Kehr himself says that should the occasion for it again arise he would prefer permanent external drainage of the biliary hepatic ducts—cholangiostomy.

THE PANCREAS.

Operation at an Early Stage of Pancreatitis. Bardenheuer[2] reports two operations for pancreatic disease. If the diagnosis in these cases is a little uncertain it is because the patients were operated upon before the lesions were well advanced. For this reason the cases are worth study. The first case is as follows: A man, aged forty years, healthy, fell and struck his right side against a sharp corner. He continued working for ten days, and then gave up on account of pain in the epigastric region, extending to the right shoulder. There was no vomiting, but diarrhœa and loss of weight. The stools contained undigested muscle fibres and fat. There was no sugar in the urine. Pressure below the liver gave an indistinct sense of resistance. As these symptoms continued, an exploratory incision was made ten weeks after the accident. The hepatic flexure of the colon was attached to the liver by light adhesions, while the adhesions between its under surface and the duodenum and pancreas were very firm. The stomach and upper part of the duodenum were much dilated. The head of the pancreas was enlarged, engorged with blood, and felt harder than normal. The remainder of the organ was atrophied. The gall-bladder was not altered. This seemed to be a case of pancreatic hemorrhage or at least interstitial pancreatitis following a comparatively slight accident. The adhesions were freed and gastroenterostomy performed. The patient entirely recovered.

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[1] Mitt. Grenzgeb. med. Chir., 1904, vol. xiv. p. 104.

[2] Arch. klin. Chir., 1904, vol. lxxiv. p. 153.

In the second case a fat man, aged forty-four years, a heavy drinker, suffered from attacks of epigastric pain and vomiting beginning six months after infection with syphilis. Antisyphilitic treatment gave no relief from these painful attacks, which were similar in character to attacks of gallstone colic. There was obstinate constipation. There was indefinite resistance in the mesogastric region. A median incision revealed a fluctuating tumor behind the stomach and gastrocolic ligament. There was no fat necrosis in the peritoneum. The membrane was torn through and a great quantity of fresh and old blood escaped. The pancreas felt rough and necrotic in places, but it could not be brought into view. The cavity was drained, and discharged for a time only bloody fluid. In three weeks sugar and steapsin were demonstrated in the discharge, and in four weeks also trypsin. As the discharge continued free and the sinus showed no sign of closing, the pancreas was exposed through a left lumbar incision and separated from the sinus of the first incision, and the pancreatic attachment was ligated and cauterized. The sinuses were entirely closed in three months and the recovery of health was perfect.

Bardenheuer considers this second case one of acute pancreatitis with hemorrhage into the pancreas, which was very likely diseased before the hemorrhage occurred. The atrophy was secondary to the hemorrhage. It is thus seen that an early incision in such obscure cases may serve not merely to define the diagnosis, but to save the patient from the consequences of lesions, that without such intervention generally prove fatal.

THE SPLEEN.

Rupture of the Spleen. Gerrard[1] mentions an instance of rupture of the spleen recovering under medical treatment. A Chinese boy aged fourteen years was run over by a four-wheeled carriage, the wheel passing across the lower portion of the chest. The symptoms were hæmoptysis and frothy expectoration and rapid and feeble pulse and respiration and shock. There was dulness in the lower portion of the left chest and in both flanks. The conditions were not favorable to laparotomy, and the patient was therefore given ♏ x of the liquid extract of ergot and ♏ x of the tincture of opium every hour until plainly under the influence of the opium, while iced compresses were applied to the left side of the chest and abdomen. A saline enema of 8 ounces was administered every hour. Fluid by mouth was given for the first time four and a half hours after the accident. The patient made a good recovery. The dulness in the right side of the abdomen disappeared in five days; the area of splenic dulness was still enlarged when the patient left the hospital, twenty-four days after the accident.

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[1] Dublin Journal of Medical Sciences, 1904, vol. cxvii. p. 425.

Some surgeons are inclined to question the diagnosis when a patient recovers from a severe abdominal injury without operation. This is hardly fair if the symptoms are in accord with the diagnosis. It is unfortunate that Gerrard did not publish a record of the pulse-rate for the forty-eight hours following the rupture.

Splenectomy for Splenic Anæmia. Carstens[1] reports the removal of a spleen, weighing fourteen pounds, for splenic anæmia. The blood count showed 3,800,000 red and 1250 white cells. There was considerable loss of blood at the operation, and recovery was delayed by delirium, and the bursting open of the cicatrix necessitating a second irrigation of the abdomen and resuture. The patient left the hospital weighing ninety-seven pounds. Eight months later he weighed one hundred and ninety-three pounds, and his blood count gave 5,448,000 red and 9250 white cells. He was in perfect health except a small ventral hernia.

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[1] Journal of the American Medical Association, 1904, vol. xliii. p. 980.

GYNECOLOGY.

By JOHN G. CLARK, M.D.

Cancer of the Uterus. All who have been actively engaged in gynecological surgery have passed through stages of enthusiastic hope, but in the end have been disappointed in the ultimate results from hysterectomy for cancer of the uterus, and several prominent gynecologists have fallen into a state of the direst pessimism so far as the cure of this disease is concerned. While the operative statistics up to this time must dampen the enthusiasm of even the most optimistic surgeon, they are, nevertheless, sufficiently encouraging to cheer the pessimist if the ultimate results are given an unprejudiced, critical review.

In the experience of all who have suggested or adopted the more radical methods of operation for cancer of the uterus, the analogy between cancer of the breast, with its axillary glands, and the uterus, with its iliac glands, appeared to be so self-evident as to lead to the rational conclusion that if the more radical operation for cancer of the breast gave better ultimate results, quite naturally the execution of this principle in cancer of the uterus would likewise improve the curative statistics. My experience has extended over ten years' observation of these cases, and while it has not been as extensive as that of Wertheim, of Vienna, it has been sufficient to rob me of the stimulating hope that by carrying out the most radical measures the patient may be afforded a greater chance for escape from her direful fate. While formerly I urgently advocated removal of the glands adjacent to the uterus, my principle at present is to remove all local tissue as far as possible without reference to the iliac glands, for, as my experience demonstrates, and is further sustained by other statistics, our patients die from local continuance of the growth rather than from widespread glandular metastasis. Therefore, the widest local operation without consideration of glandular metastasis is advisable; for if the glands are involved, recurrence, in my opinion, is unavoidable, regardless of the most radical measures. No one man's experience is sufficient to answer any question pertaining to the cure of cancer, and therefore the safest conclusion may be reached from a collective statistical study.

A very pertinent question in this study is: Does cancer give early metastasis? In answer we have various and very divergent opinions.

Riess, who was the first to advocate a radical operation with a view to the extirpation of the pelvic lymph glands, still holds very tenaciously to the opinion that metastasis occurs very early, and has consistently adhered to the most radical principles in his operations. Cullen was one of the first investigators to go on record against this theory, for in only a small proportion of cases did he find involvement of the pelvic lymph glands. Ten years have passed since these statements were first made, and sufficient material is now at hand to reach a more accurate conclusion.

As the result of Cullen's work he made the following statement: "As a matter of fact, the glands are not often involved; at any rate, only very rarely before the disease has advanced so far that the case has become inoperable." And, further, relative to cancer of the body, he says: "It may be safely said that in nearly all operable cases of adenocarcinoma of the body no glandular involvement has taken place." Cullen's views fully coincide with those of Winter,[1] who found the glands involved in only two cases in forty-four autopsies on patients where the disease was still confined to the uterus.

With the statements of Winter and Cullen before us the necessity for the radical removal of the glands, especially as this extra step prolongs the operation very materially and adds greatly to the dangers of shock, sepsis, and renal and ureteral complications, seemed much less urgent. Nevertheless, my own policy until the last four years has been in favor of the radical operation with extirpation of adjacent glands. Of late, however, as I have frequently stated, I consider the removal of the glands of prognostic rather than of curative value. As in many of the practical fields of surgery, so here, the radical operation was more or less extensively modified, and Werder, of Pittsburg, antedated Wertheim in the proposal of a radical operation which possessed advantages over the methods employed by Riess and myself.

The statements of Cullen[2] and Winter were quickly challenged by Peiser, Wertheim, Riess, and others, Wertheim claiming that metastases had been overlooked by these observers because serial sections had not been studied. Thus, Peiser in a considerable number of autopsy cases found the glands involved in 50 per cent. Wertheim, after perfecting his operation, reported 60 cases in 1901, and as a result of careful serial sections of the glands removed he found 31.7 per cent. of all cases involved, and in 15 per cent. of the earliest cases there were demonstrable metastases. He, therefore, found a much larger percentage than either Winter or Cullen, and thus justified the trial of the more radical operation.

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[1] Zeit. f. Geburt. u. Gynäk., Bd. xxvii. S. 101.

[2] Münch. med. Wochenschrift, Bd. xvii. H. 28.

Schauta,[1] of Vienna, has had a very large experience with vaginal hysterectomy, and has recently considered the question of glandular metastasis in cancer of the uterus most thoroughly, and has furnished data which strongly sustains his plea for a radical local operation rather than a widespread search for glandular metastasis. He, therefore, takes strong issue with Wertheim. In this study of 60 cases which died either as the result of operation or from the natural effects of the disease, each case has been thoroughly studied to determine the frequency of glandular metastasis, and the relationship of the pelvic to the higher retroperitoneal lymph glands.

In order to study the glandular areas according to topographical localities, he divides them as follows: 1. The sacral glands, which are found on the anterior surface of the sacrum and in the mesorectum. 2 The iliac glands, which are situated in the triangle between the external and internal iliac vessels; also along the course of the common iliac vessels. These two groups of glands he looks upon as being operable areas, in that they may be reached during the course of hysterectomy.

The glands which cannot be reached by an operation are: 1. Those situated along the sides of the aorta, from its bifurcation to the renal vessels. 2. The cœliac glands, which are situated between the renal vessels and the diaphragm. 3. The superficial inguinal glands. 4. The deep inguinal glands. While the inguinal glands are unquestionably operable, they are comparatively seldom involved in cancer of the cervix. Therefore, they need not be seriously taken into consideration in the more radical methods of operation.

In Schauta's series of 60 cases death followed operation in 11, 9 died of intercurrent affections, and 40 from the natural termination of the disease. In considering the question of operation in these cases from the standpoint of glandular metastasis, Schauta divides them into the following groups: Group 1, both the lower and upper series of glands free of disease in 26 cases, 43.3 per cent.; Group 2, the lower pelvic glands carcinomatous, while the upper glands were free in 8 cases, 13.3 per cent.; Group 3, the lower glands free, but the upper the seat of metastasis in 5 cases, 8.3 per cent.; Group 4, both the upper and lower series of glands involved in 21 cases, 35 per cent. From this study of cases it is evident that there were 48.5 per cent. of cases in which the lower glands were carcinomatous, but only 13.3 per cent. could have been saved by the most radical operation, for in the remainder the upper series of glands which could not have been removed were involved.

It is also a rather surprising observation that notwithstanding the majority of these patients died from the natural termination of the disease, 43.3 per cent. were entirely free of carcinomatous metastasis. In my opinion, it is this class of cases with which we must definitely reckon in considering the permanent cures following hysterectomy for cancer.

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[1] Monat. f. Geburt. u. Gynäk., 1904, Bd. xix. Heft 4.

Relative to the time of metastasis, all observers recently have agreed that the extent of the disease furnishes no criterion as to the presence or the extent of the metastasis. Also another fact which has been prominently brought into the foreground, especially by Schauta, Kundrat, and others is that the size of the gland is of no clinical value in deciding whether it is the seat of cancer. In this series of Schauta's cases notwithstanding the majority of his patients died from the disease without operative intervention, in almost one-half the cases the cancer was still a local disease. Certainly as yet no one has satisfactorily explained the peculiarities of metastasis in these cases; why a cancer which is only starting upon one lip of the cervix should give a metastasis and another case of the most advanced involvement should be free from this complication. Another peculiarity of glandular metastasis is that a lymph gland may be greatly enlarged and may be palpated as a well-defined mass, and yet is not necessarily the seat of carcinoma, while a small adjacent gland is found on microscopic examination to be the lodging place for cancer cells. Relative to this question of lymphatic involvement, Schauta, Kroenig, and others are skeptical as to whether malignant cells always continue to develop after they are lodged in the lymph glands. They believe that in a certain proportion of cases they do not grow, but are either retained in the lymph glands as foreign bodies or undergo degeneration and are destroyed.

From these observations it would seem that the prolongation of a radical operation, with its attendant higher mortality, may not be justifiable. This would seem to be especially true if in general Schauta's observations were to prove true, that in only 13.3 per cent. of cases is the metastasis localized solely to the pelvic areas, which might be totally extirpated. Then, too, a point which has frequently been noted of late is that the glands alone are not the sole nesting places for the cancer cells, for the lymph vessels and adjacent connective tissue in many instances have been involved.

With these observations before us the outlook for the improvement in the mortality rate following a more radical operation with the extirpation of the lymph glands is, to say the least, discouraging. While we may consider these statistics of Schauta's as coming from an operator who is prejudiced in favor of vaginal hysterectomy, we do not find much to offset his conclusions in the work of Wertheim and his assistant, Kundrat. As a result of Schauta's study he comes to the following conclusions: 1. In cases of uterine cancer in which the operable group of glands is involved it is probable that the higher situated glands are likewise invaded, thus making a radical operation impossible. 2. Large, hard, infiltrated glands are frequently not cancerous. 3. Even the smallest glands may be cancerous. 4. Cancer may not strictly be confined to the glands, but is found in lymph spaces, connective tissue, or in veins between the glands.

In Wertheim's last report of cases I am inclined to feel that he has not sustained his position; on the contrary, I believe he has confirmed the statistics of his opponents.

From an analysis of Wertheim's 80 cases it will be seen that in 54 cases the lymph glands were not involved, and therefore the radical operation did not increase the prospects of permanent cure, while the same procedure certainly was attended with much greater dangers of immediate mortality. If to the remaining 26 cases we were to apply the results of Schauta's research, only 13 per cent. were operable from the radical standpoint; for if his observations are correct, in only this small percentage was the metastasis located solely in the pelvic glands accessible to the radical operation.

That Wertheim is laying less stress upon the extirpation of the gland is, I believe, shown in two paragraphs in his report of 1901. He says:

1. It is an error to consider that the chief stress is laid upon the extirpation of the glands. Just as important, indeed more important, is the widest possible removal of the parametrium. 2. According to his latest observation it is not necessary to remove the glands if they are not enlarged.

Contrary to Wertheim's conclusions upon this last point, Oehlecker, v. Rosthorn, Kroemer, Cullen, Sampson, and others claim that the size of the gland bears no relationship to metastasis, for large beaded glands may contain no trace of cancer cells, whereas in the immediate vicinity a very small gland may contain many epithelial cells. Thus, Wertheim's latest statement, that unless the glands are palpably enlarged they need not be extirpated, is based upon a fallacy and cannot be maintained; for if, as now appears certain, the foregoing observers are correct, the entire force of Wertheim's argument in favor of the removal of the glands falls to the ground, and if the last principles are followed we shall never be able to determine how much the removal of the glands has increased the ultimate recoveries. Certainly, a considerable number of cases in which no palpable glands are found will still be the seat of more or less metastasis. If the principle of glandular extirpation is to be of avail, then it must be systematically carried out in all cases, whether the glands are palpable or not. As I view this question, I believe that Wertheim's cases sustain rather than disprove Schauta's argument. From the study of Wertheim's operative cases we find that in 67.5 per cent. the lymph glands were not involved. In Schauta's series, largely of cases dying from the natural results of the disease, 43.3 per cent. were free of glandular metastasis.

When we take into consideration the fact that there is no regularity of metastatic distribution, that the earliest cases may have already given metastasis, that when the lower accessible glands are involved, the upper inaccessible glands, with the exception of only 13 per cent., are also involved, little argument is left in favor of the removal of the glands, with the largely added mortality that must necessarily follow this step from shock, infection, and other complications. My own conclusion, therefore, although very reluctantly reached, is that we lose more than we gain in the radical operation when the glands are painstakingly extirpated, and to remove here and there a palpably enlarged gland will certainly not promote the patient's interest so far as a radical cure is concerned. My own rule, therefore, is to remove one or more glands, if they are palpably enlarged, for microscopic examination. If metastasis is found, the prognosis is inevitably bad. If we are not to look for improvement in ultimate results from the radical operation with the removal of the glands, from what operative precedure may we gain the greatest good? Shall it be a high amputation of the cervix, a simple vaginal hysterectomy, a Schuchart's vaginal hysterectomy facilitated by paravaginal incisions, or Wertheim's radical operation? Of these various methods I would discard all but the abdominal one. This I carry out most radically with the actual cautery, so far as the vagina and parametrium are concerned, and in this I revert to the principle so strongly insisted upon by Dr. Russell after his study of 48 vaginal hysterectomies. He found almost invariably that there were recurrences at the site of the operation scar, and not in more or less widely remote metastatic areas. The rule, therefore, to which I adhere, is to remove all possible tissue in the vicinity of the primary site of the growth, using the cautery rather than the knife. In general, the principles laid down in Wertheim's latest publication are followed, stopping short with the removal of a considerable cuff of vagina with the uterus, and as much parametrium as is possible, and not prolonging the operation by a search for glands. In acting upon this principle I am influenced by the fact that as yet no operation has saved 50 per cent. of cases, and that in Wertheim's operable cases 59 per cent. showed no glandular metastasis, while even in the far-advanced autopsy cases of Schauta there were 43 per cent. free of lymphatic involvement, and that of the remainder which were involved, only 13 per cent. could have had their chances for a more radical cure enhanced by a removal of the glands. This small percentage of possibility is at least equalized or more than offset by the much greater immediate mortality of the very radical operation.

C. P. Noble[1] reports his further experience with the *Downes electrothermic clamp.* Up to the present time he has had 10 cases. In 7 of these the disease had extended beyond the confines of the cervix, and a number of them would have been inoperable by the ordinary means. The only objection to the operation is the frequency with which injury to the bladder or ureters occurs. In Noble's series there were such accidents in 5 cases. There is a great technical advantage in using these clamps, for it avoids annoying oozing and leaves a dry field to be covered in by the peritoneal flaps.

Olshausen, who for the last several years has been an advocate of vaginal hysterectomy for cancer of the cervix, has recently compared his statistics as to immediate mortality, and so far as possible as to recurrences with those of Wertheim and Zweifel.[2] In Zweifel's experience with 270 cases which represent 26.7 per cent. of all cases presenting themselves at the clinic for treatment, the primary mortality following vaginal hysterectomy was 5.45 per cent.; after the second year 44 per cent. were alive, and after the fifth year 35.6 per cent. However, as the end result of his statistics, there was only an absolute cure in 9.72 per cent. of the cases. Wertheim's operable cases numbered 120, or 40.3 per cent. of those presenting themselves at the clinic for treatment. His primary mortality was 20 per cent.; as yet none of his cases have passed the five-year period; so that it is impossible to say what his ultimate cures will be. Olshausen operated upon 671 cases by vaginal hysterectomy, and his percentage of operability was 31 to 44 per cent. Eighteen per cent. survived more than the five-year period.

Within the last decade the percentage of operability has increased from 31.6 to 61.6 per cent. The increase in the number of operable cases is unquestionably due to the continuous agitation in Germany, during the last few years, in favor of the early diagnosis and prompt operation in cases of cancer of the uterus.

Etiology of Carcinoma. The surgical aspect of the carcinoma problem is so unsatisfactory that the number of investigators endeavoring to discover the cause of carcinoma is on the increase. This activity is stimulated by the conclusion that if carcinoma is ever to be successfully treated it must be by some other means than that generally employed at present. Although its early recognition is a matter of the greatest importance from the surgical standpoint, there is still an urgent need for some more effective therapeutic measure to cope with it successfully. When once the origin of carcinoma is settled, then the solution of its therapeusis may be easier.

[1] Journal of the American Medical Association, vol. xliii. No. 19.

[2] Zeit. f. Geburt. u. Gynäk., 1903, Bd. l.

Plimmer[1] says the idea that carcinoma is an infectious disease is an old one. After the development of bacteriology the manifest difference between carcinoma and the diseases well established as infectious gave rise to the theory that carcinoma was due to an animal parasite or protozoan instead of a vegetable organism. There are a number of reasons for suspecting an infectious origin of this disease. Among these are: an apparent increase of cancer in certain districts, its prevalence in certain houses, and in low-lying, damp, and wooded districts.

In this connection Behla's story of the village of Luckau is most interesting (quoted by Plimmer). Luckau has a population of 5000 inhabitants, most of whom are tillers of the soil. The population remained practically stationary between the years of 1875 and 1898. The village consists of a main central part, and an eastern and western part. There are 3000 people living in the central town, 1000 in the eastern, and 1000 in the western. The houses throughout the village are of the same simple construction, but the soil of the central and eastern town is low and damp, while that of the western is high and sandy. A large drainage canal filled with stagnant water encircles the central and eastern town, but does not touch the western. The deaths from cancer between the years mentioned numbered 1 out of 25 or 30 for the entire town, and 1 out of 9 for the eastern town. The cases in the central town occurred mainly in houses bordering along the canal, the water of which was used by the inhabitants to water their vegetables, many of which were eaten raw. There were 127 houses in this quarter, and 56 contained patients suffering with cancer; 43 of them had 1 case each; 10 had 2 cases each; 2 had 3 cases each; and 1 had 4 cases. Behla believes the source of the infection was in the uncooked vegetables.

Confirmatory of this theory Lyon found twice as many cases of carcinoma in the German as in the native wards of the city of Buffalo, and says that most of the Germans raise their own vegetables, many of which are eaten uncooked.

Foucalt[2] describes the town of Fontainebleu, which is surrounded by a large forest, and says that the death-rate from carcinoma in the past forty years has been 7 per cent. of the total deaths. The cancer houses were invariably badly ventilated, with little or no exposure to sunlight, and were situated in the lower and damper parts of the town.

These statements are certainly striking, but they cannot be convincing in the light of other investigations. In last year's PROGRESSIVE MEDICINE I quoted Bollinger's statistics for Münich; this author gave theoretic reasons for the increase in carcinoma, but showed that it was more apparent than real. Hoeber[1] presents a comprehensive study of the conditions which accompany cancer in the city of Augsburg, Germany. The city has a population of 84,097; the average death-rate is 27.74 per 1000, and 5.5 per cent. of these are due to new-growths. He tabulates the statistics for the years 1892–1901, inclusive. It is noticeable that in 1892 there were 1.1 in 1000 inhabitants who died of new-growths; in 1901 this had reached 1.3 per 1000 inhabitants—an insignificant variation. During the same period, among 100 deaths 3.8 died from new-growths in 1892, and 6.5 in 1901. But in 1894 the proportion of those dying from new-growths was 6; so that the increase from 1892 to 1901 is not really the difference between 3.9 and 6.5. In fact, between 1894 and 1901 the proportion had diminished, the average for the entire ten years being 5.5 per cent. Among 775 houses where carcinoma occurred, in 663 there was 1 case, in 100 there were 2 cases, in 6 there were 3 cases, and in 6 there were 4 cases. Hoeber's paper is accompanied by maps showing the location of the cancer houses, the soil, and the geological foundation. He was unable to discover any relation whatever between the location of the cancer houses and the soil, drainage, elevation, etc. The disease was most prevalent in the poorer quarters.

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[1] British Medical Journal, December 5, 1903.

[2] Bulletin de l'Académie de médecine, lxviii, No. 22.

Two years ago I gave Israel's views upon the origin of cancer; he believed constant irritation so encouraged the proliferation of epithelium that it might, in time, penetrate the connective tissue. Plimmer, however, calls attention to the normal hypertrophy of epithelium, as seen upon the hands and feet in corns and bunions. They are the direct result of mechanical irritation and yet they never produce carcinoma, and when the source of irritation is removed the hypertrophy disappears. He quotes von Hansemann, who says that an irritation affecting a normal cell produces hyperplasia, while if it affect an anaplastic cell—*i. e.*, one which for some reason has become essentially altered so that it grows like an embryonal cell—carcinoma results. Plimmer believes the cause of this anaplasia of the cell and the source of its growth is dependent upon a parasite. In applying this theory he finds an explanation for the fact that not all metastatic carcinoma cells give rise to secondary growths. If the metastatic carcinoma cell is not the seat of an organism the cell dies; if an organism is present it grows. He believes that the prevalence of carcinoma on the exposed and unclean parts of the body favors the theory of cancer parasites. In several cases of epithelioma of the lip which he observed, soap had not been used for years. As a further instance of its infectious character, he calls attention to its local transplantation from the upper to the lower lip, and from one labium to another. He also mentions Harrison Cripp's case of transplantation from an ulcerating breast to the skin of the arm. Behla has found nineteen well-attested cases of "cancer a deux"—that is, cancer occurring in people who are living together.

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[1] Zeit. f. Krebsforschung, 1904, Bd. i.

Much is made of the fact that cancer cannot be inoculated from man to animal; but this is also true of such infectious diseases as leprosy and the exanthemata. Moreover, there is a disease of plants, Kohlhernie, caused by the *Plasmodophora brassicæ*, which has been compared to carcinoma, and can only be inoculated upon a plant of the same species.

There is no longer any doubt that carcinoma can be inoculated from one animal to another of the same species. Jensen[1] has recently had 40 to 50 per cent. of successful results in the inoculation of mice from one animal to the other. The same inoculations into other animals were negative. Although Jensen himself regards these simply as instances of implantation growths, Plimmer believes they are evidences of infection, because ordinary epithelium transplanted to another animal may grow for a while, but invariably is destroyed by phagocytosis.

Orth[2] says that up to the present time: 1. That no one has produced proof that carcinoma is of parasitic origin. 2. There is no necessity to assume a parasitic etiology for carcinoma. The transplantation experiments he regards as no proof whatever of infection. Transplanted periosteum, he says, will grow and produce cartilage and bone, and epidermal scales are frequently successfully transplanted. Orth finds the weakness of the parasitic theory in this: that in order for a growth to be produced some of the cancer cells have to be transplanted. *He does not consider it impossible that an intracellular organism may play a part, but he thinks it impossible that it plays an independent part.* If it were possible to produce tuberculosis only through the transplantation of tuberculous tissue, then the tubercle bacillus would never certainly have been proved as the etiological factor. It is only through the production of a primary cancer from a pure culture of an organism that its bacteriological origin can be demonstrated.

Morris[3] makes practically the same statement, and draws attention to the fact that all the granulomata (inflammatory tumors) produced by organisms maintain a uniformly identical structure in whatever part or tissue it may arise. If this same rule obtained in carcinoma, in case it is infectious, then we should have to imagine a different organism for each variety of carcinoma.

Morris believes in the inclusion theory of Cohnheim, as elaborated and modified by Durante, Nicoladoni, Ribbert, and Senn. This pre-

[1] Centralblatt f. Bakt., June, 1903.

[2] Annals of Surgery, December, 1904.

[3] British Medical Journal, December 5, 1903.

supposes the existence of congenital matrices of embryonal cells and the existence of postnatal matrices. It also allows for the continuance of these matrices in a dormant state for a time until they are aroused into activity by sources of irritation. It goes without saying that these hypotheses account for a large number of benign tumors. The question is, Does it obtain in malignant growths? Several facts seem to indicate that it does. For example, carcinoma is quite frequent in those parts where embryonal inclusions are found. As instances of this Morris notes sarcoma and epithelioma of the upper jaw and mandible, and carcinoma of the uterus, œsophagus, rectum, tongue, and mouth. The common occurrence of carcinoma of the lip along the line of juncture between the mucous membrane and the skin, as well as the site of carcinoma of the rectum, frequently corresponding to the line of union between the cloaca and the hind gut, is very significant from an embryological standpoint. Benign growths may become transformed into malignant ones, as instanced by warts, moles, papillomata, etc. It may also be true that in the process of growth of the benign tumor some of the daughter-cells may fail to attain the degree of differentiation that the parent cell attained, and may subsequently develop on their own account into a malignant neoplasm.

It is but natural when such arguments are brought to bear for and against the parasitic theory of carcinoma, or at least for the participation of parasites in the production of new-growths, that we are attentive to an entirely new hypothesis, which reconciles some of the doubtful points on both sides. Kelling,[1] of Dresden, denies the possibility of the production of cancer from already existing epithelium. To substantiate this he refers to the work of Petersen and Borrmann[2] and Pforringer.[3]

Ribbert's view, that carcinoma is a collection of embryonal cells, is sound; he believes, however, that these embryonal cells do not bear the relation of consanguinity or heredity to their host, but that they are distinctly foreign cells—introduced from without—and that their action may be compared to that of a parasite. He shows how frequently living embryonal cells gain entrance into the body, as, for example, from the eggs of fish, insects, etc., in drinking-water, or food, or from imperfectly cooked eggs, or from the bites of insects. In order to prove his hypothesis, he hatched a number of hens' eggs to a suitable stage, and then cut up and ground the embryos in a mortar. The embryonal cells were then suspended in physiological salt solution and injected into dogs. Only a part of an embryo was used in a single case.

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[1] Münch. med. Wochenschrift, Bd. xi. H. 24.

[2] Verhandlung des XXXII. Chirurg. Kongres, 1903, S. 64 u. 71.

[3] Bruns' Beiträge z. klin. Chir., Bd. xli. S. 687.

Of 14 dogs thus inoculated, 7 were killed in the course of a few weeks and in 5 new-growths were found.

SUMMARY OF RESULTS.

I. Injection into testicle and femoral vein.
Result: Round-cell sarcoma of testicle.
Malignant adenoma of the liver.
II. Injection into vein of small intestine.
Result: Malignant adenoma of liver.
III., IV., V. Injection into liver or nearby vein.
Result: III. Spindle-cell sarcoma.
IV. Spindle-cell sarcoma.
V. Malignant alveolar tumor.

The author speaks of the possible objection to his findings on the ground that the tumors existed beforehand. All the animals, however, were carefully examined to detect the presence of any growth, and in three of them laparotomy was performed in making the injection, and the abdominal organs were thoroughly inspected. His article contains illustrations of microscopic sections of the new-growths, which appear to prove his assertions.

These experiments, he thinks, indicate the entire prophylaxis and therapy of malignant tumors, and he has already begun treatment along these lines. While he believes that aberrant embryonal cells may occasion a tumor of consanguinity, he is convinced that such tumors are always benign. It is the foreign embryonal cells which produce the malignant growths.

Other investigations bearing upon the etiology of carcinoma ma be noted. Wolff[1] calls attention to the frequency with which carcinoma attacks organs communicating more or less directly with the exterior, as the stomach and uterus. He also speaks of the prevalence of carcinoma in his neighborhood, where, in a population of 11,703, there were 159 cases of cancer in nine years.

Adams[2] calls attention to the few native-born Australians who have carcinoma, and believes that this is due to the prophylactic properties of the eucalyptus tree. He believes strongly in syphilis as a predisposing factor in cancer. Among Australians the number of deaths per 100,000 from carcinoma is 22.6, among British 203.1.

Newsholme[3] from an analysis of the statistics of the United Kingdom Temperance and General Provident Institution, finds a greater number of deaths from all causes and from cancer among non-abstainers.

In conclusion, it may be said that Monsarrat,[4] Feinberg,[5] and E. von

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[1] Zeit. f. Krebsforschung, 1904, Bd. i.
[2] Lancet, February 13, 1904.
[3] British Medical Journal, December 12, 1903.
[4] Ibid., January 23, 1904.
[5] Wiener klin. Woch., Bd. xvi. H. 46.

Leyden[1] have recently described as parasites bodies which they have found in carcinoma cells. The organism Feinberg describes agrees with those found by Plimmer and von Leyden.

Early Diagnosis of Cancer. In last year's PROGRESSIVE MEDICINE I quoted a number of authors (Winter, Kelly, Anspach) who urged the necessity for the early recognition of carcinoma on the ground that it was only in incipient cases that there was much hope of cure. Winter set about in a practical way to secure this result by sending to all of the physicians and midwives in East Prussia circulars and pamphlets, calling their attention to the early symptoms of cancer and to the necessity for prompt intervention. He also had newspaper articles printed, impressing the laity with the seriousness of the disease, and the ease and frequency with which an early case might be overlooked. Recently Winter published the result of the first year of his crusade. He compares his statistics for the year 1903 with those of the four previous years, 1898–1902. His total number of cases for the year of which he has full knowledge is 84. The improvement may be shown in various tables:

I. Percentage of cases in which the necessity for an immediate gynecological examination was not recognized by the physicians:

1898 to 1902	14.2 per cent.
1903	11.0 "

A gain of 3.2 per cent.

II. Number of times currettings and cervical tissue were sent to laboratory for diagnosis:

1898 to 1902	14
1903	53

A gain of 39 cases.

III. Attitude of midwives: Of the 84 patients, 8 consulted midwives.

Not examined by them, but immediately referred to physicians	3
Examined by them, but then sent to physicians	3
Examined and treated by midwife	1
Details not known	1

There was but 1 case out of 7 in which the midwife was ignorant or dishonest. From 1898 to 1902 Winter has knowledge of 28 cases which fell into the hands of midwives, and 15 of these were expectantly treated.

IV. To show the effect upon the public mind. The interval of time between the patient's first observance of symptoms and the consultation of a physician:

	1898 to 1902, 234 women.	1903, 55 women.
Within one month	14 per cent.	22 per cent.
Longer than one month	18 "	35 "
Longer than three months	26 "	33 "
Longer than six months	12 "	5 "
Longer than nine months	18 "	5 "
Longer than one year	12 "	0 "

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[1] Zeit. f. Krebsforschung, 1904, Bd. i.

V. Showing the time allowed to elapse between the advice for operation and the acceptance of that advice:

	1898 to 1902, 122 women.	1903, 60 women.
Eight days	63 per cent.	78 per cent.
Two weeks	15 "	12 "
Three weeks	3 "	0 "
Four weeks	3 "	5 "
Two months	4 "	3 "
Three months	5 "	0 "
Four months	2 "	2 "
Six months	2 "	0 "
One year	2.5 "	0 "
Over one year	0.5 "	0 "

In other words, 57 per cent. against 32 per cent. consulted their physician within the first three months, and 90 per cent. against 78 per cent. accepted advice for operation within fourteen days.

The most evident result of Winter's crusade would naturally appear in the percentage of operable cases. He says that there is some difficulty in estimating this because the question of operability rests largely upon the judgment of the individual operator.

VI. From Winter's own cases and those of others, it appears that the operable cases in his own hands numbered in—

1898 to 1902.	1903.
71 per cent.	82 per cent.

In the hands of others:

1898 to 1902.	1903.
52 per cent.	65 per cent.

Showing an average in increase of from 62 per cent. to 74 per cent.

To show the impression of Winter's crusade upon physicians it may be stated[1] that the obstetrical and gynecological societies of Dresden and Leipzig are sending duplicates of Winter's circulars to all the physicians in Saxony. The *Berliner klinische Wochenschrift* remarks, however, that the chief obstacle in this work is the activity of irregular practitioners and "herb women." If the crusade is to have any permanent value in some sections these charlatan practices must be regulated or abolished.

Wolf suggests as a further ensurance of the early treatment of cancer that a law shall be enacted making it compulsory to report all such cases to the health authorities.

Non-operative Treatment of Cancer. Because apparently hopeless cases of cancer are sometimes cured or relieved for periods of two to five years, Lomer[2] believes the economy is able, under certain circumstances, to successfully combat a new-growth. The fact that fever and infectious diseases and severe burns at times favorably influence the course of the disease seems to indicate that profound changes in the blood may have a direct antagonistic influence upon a cancerous growth.

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[1] Journal of the American Medical Association, vol. xliii. No. 24.

[2] Zeit. f. Geburt. u. Gynäk., Bd. l. H. 2.

Lomer is now experimenting with a view to the production of a serum which he hopes will have such an effect. The author has found 149 cases of carcinoma in the literature treated by electrocauterization or thermocauterization, in which there had been no recurrence for five years. As the result of this observation he would recommend:

1. Repeated cauterization of every suspicious area in the cicatrix after extirpation of operable carcinomata; frequent and systematic cauterization in inoperable cases.
2. Local applications of heat.
3. Exhibition of potassium chlorate and arsenic.
4. Regular irrigation of the vagina with potassium chlorate.
5. Injection of substances which produce fever—perhaps a culture of staphylococcus.

He recommends for investigation:

1. The action of epithelial serum and hæmolytic human serum upon visible carcinoma.
2. The existence of leukocytosis in carcinoma and whether this exists independent of ulceration.
3. The behavior of cancer subjects in regard to soluble bacterial toxins (tuberculin, staphylotoxin).
4. The reason for the small disposition of cancer subjects to contract infectious diseases, and whether this is due to histogenic, bactericidal, or antitoxic influences.
5. Whether there circulates in the blood of cancer subjects toxic substances which produce the cachexia (this would comprise a study of the isotoxins and of hæmolytic and agglutinating substances in comparison to the normal human blood).
6. Treatment of carcinoma patients with inorganic and organic blood poisons, potassium chlorate, arsenic, phenylene diamine, etc.
7. Extravascular resistance of the red blood corpuscles of carcinoma subjects to different blood poisons.

The treatment of carcinoma by means of the Finsen light, x-rays, and *radium* continues to be a favorite topic of discussion. Hopkins,[1] Turner,[2] MacIntyre,[3] Burns,[4] Tuffier,[5] Exner,[6] Lassar,[7] Apolant,[8] and others have made contributions, either from the clinical side or from the purely scientific aspect in accounting for the action of radium on tissue.

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[1] Brooklyn Medical Journal, December, 1903.

[2] British Medical Journal, December 12, 1903.

[3] Ibid.

[4] Therapie der Gegenwart, Berlin, Bd. xlv. No. 1.

[5] Presse médicale, vol. i., No. 10.

[6] Wiener klin. Wochenschrift, Bd. xvii. H. 13.

[7] Berliner klin. Wochenschrift, Bd. xli. H. 20.

[8] Deutsch. med. Wochenschrift, Bd. xxv. H. 31.

Abbe[1] has written a paper on radium which gives us a detailed account of this interesting substance. Metallic radium has not yet been isolated, the substance on the market being a chloride of barium and radium. The strength of a given specimen is denoted by the time it requires to discharge a gold-leaf electroscope. The standard unit is the time required by metallic uranium for the same purpose. If the specimen of radium discharges the electroscope in one-thousandth the time required by uranium, the strength is represented by one thousand.

Specimens of high strength are generally used, anywhere from 200,000 to 300,000. Observations show that the radium rays do inhibit or diminish the growth of certain forms of bacteria, but, unfortunately, they are not without harmful effects, and like the *x*-rays may produce burns which appear several weeks after exposure, causing large ulcers which are difficult to heal. With regard to its therapeutic value, the radium rays are on a par with the *x*-rays. As stated in last year's PROGRESSIVE MEDICINE, the *x*-ray in some cases of carcinoma does good, but should never take the place of surgical intervention. Its employment is solely for those cases of recurrence of carcinoma or inoperable carcinoma in which the surer surgical intervention is no longer available.

The scientific explanation for the effect of radium rays on cancerous tissue has been discussed by Apolant, Exner, Neuberg,[2] and others. Apolant and Neuberg believe this action directly affects the cancer cells and that the increase of connective tissue is secondary. Neuberg believes the disintegration of the cell is due to a destruction of the enzymes which have to do with cell life, and a preservation and activity of the autolytic ferment. Exner believes the effect is primarily in the connective tissue, which grows and squeezes the epithelial cells out of existence. In his cases connective-tissue changes occurred in one week, but the effect upon the epithelial parts was only apparent after the fourteenth day.

In the treatment of inoperable cancer of the cervix, Martin[3] still believes in cauterization, and the old palliative operation repeated as often as required. Hegar[4] believes that possibly a medical cure for carcinoma will be found. Tuffier[5] does not believe in the value of any serum. They all do good for a time, but soon lose their effect.

Myoma Uteri. The two chief factors which mould the progressive surgeon's opinions are, first, his personal experience, and, second, the influence made upon him by a close touch with the literature of his subject. The rule has long since been established that cancer should be operated upon as quickly as it is discovered, if it is still in an operable stage. This same rule obtains relative to ovarian cysts, for a vast majority of these tumors grow steadily, and sooner or later produce complications and ultimately cause the death of the patient. Therefore, from the clinical standpoint at least, all ovarian tumors of even moderate size are looked upon as being of sufficient gravity to require an operation. Until very recently no one has taken this position relative to fibroid tumors, for with few exceptions they are benign, and, as their clinical course has seemed to show, they may remain of moderate size, producing no symptoms whatever, and occasionally may disappear or atrophy after a puerperium or at the menopause. The constancy of these observations and the fact that such a considerable number of fibroid tumors are discovered at autopsy, which have never given rise to symptoms, has led to the conclusion that unless they are producing clinical symptoms or are rapidly growing, they should not be subjected to operative treatment. Certainly the various palliative methods of treatment are of practically no value, notwithstanding the favorable reports of electric and other therapeutic methods in diminishing the size, or causing the absorption of the tumor.

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[1] Editorial, Journal of the American Medical Association, vol. xlii. No. 13.

[2] Zeit. f. Krebsforschung, 1904, Bd. xi. p. 171.

[3] Therapie der Gegenwart, Bd. xiv. H. 6.

[4] Münch. med. Wochenschrift, Bd. li. H. 15.

[5] Presse médicale, i. 10.

There is, therefore, but one of two positions to assume: either the operative or the tentative until symptoms develop. The latter plan of treatment unquestionably must depend upon the absence of the clinical symptoms, which will be enumerated further on in this review. Between the tentative or waiting policy and the operative treatment, in the larger majority of cases, the operation will sooner or later have to be instituted, and therefore the rather radical position taken by several recent writers that a tumor should be removed as quickly as it is discovered, has arguments in its favor, although the exceptions to the rule, in my opinion, are so numerous that were it generally adopted it would prove to be a too wholesale principle not to be commended. In the following pages I shall discuss the indications for operation as laid down by advocates of the more radical policy, and will summarize my own conclusions relative to the clinical aspect of the subject. A second point which will also fully be discussed is the type of operation most suitable for the removal of fibroid tumors.

ASSOCIATED DISEASES OF THE UTERINE APPENDAGES. Daniel,[1] as the result of a statistical study of the adnexa of fibroid uteri, has found in 59 per cent. pathological alterations. In about one-fourth of the cases there was catarrhal salpingitis, and in the remainder the tubes were mostly the seat of either chronic parenchymatous or suppurative salpingitis. Hydrosalpinx, hæmatosalpinx, tuberculosis of the tube, and tubal pregnancy were also encountered. The ovaries were frequently diseased, 40 per cent. of the cases showing pathological changes. The chief lesions were cystic degeneration, tumors, suppuration, and tuberculosis. The author attributes these changes to three causes: 1. Infection. 2. Fibromatous diathesis. 3. Direct action of the fibromyoma upon the adnexa, producing an obstruction in the tube and adhesive peritonitis, which may lead to the formation of a hydrosalpinx or hæmatosalpinx.

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[1] Revue de gynéc. et de chir. abdom., 1903, 1 and 2; Referat: Zeit. f. Gynäk., 1904, Nr. 44.

In spite of the frequent association of fibroid tumor and adnexal disease, the latter is often not recognized until operation or necropsy. One, therefore, should always bear this probability in mind when a patient who has a fibroid tumor complains of pain in the vaginal vault, for the tumor, unless subjected to pressure, does not cause this symptom. While pathological changes in the appendages may cause pain, it is also true that they may exist without this symptom. Daniel believes the sterility of fibroid patients is, as a rule, due to pathological changes in the tubes or ovaries.

DEGENERATIONS AND ASSOCIATED NEW-GROWTHS OF MYOMA UTERI. The question of the transformation of a fibroid tumor into a sarcoma is of great interest, because this malignant change above all others would be fatal if let alone. Henkel[1] believes it a great mistake to judge of the frequency of this transformation by sporadic cases. High percentages have been reported, but Henkel is in accord with Pfannenstiel, who says that in many of the cases there has been an error in diagnosis, and that a primary sarcoma has been mistaken for a fibroid. In 1000 cases Pfannenstiel[2] has not observed a single case of sarcomatous degeneration of a myoma. The following percentages have been recently given: Watt-Keen,[3] 4 in 417; Kummer,[4] none in 47; Menge,[5] 5 in 76; Hauber,[6] 3 per cent.; Pfannenstiel,[7] none in 1000; Henkel,[8] 1 in 121; Noble,[9] 22 in 1188.

The correlation of fibroid tumors with carcinoma of the fundus uteri has been frequently dwelt upon as another danger to which fibroid patients are subject, and some definite relation between the two has repeatedly been claimed. In other words, it has been said that a myoma growing within the uterine wall exerts an irritative influence upon the endometrium, which results in carcinoma. It is to be emphasized in this connection, Henkel observes, that Klob in the year 1864 found that 40 per cent. of all women dying beyond the age of fifty were the subjects of fibroids. At the present time when autopsies are so thorough the percentage should be higher. As carcinoma of the fundus usually occurs at a late period of life it is not surprising that the two frequently occur coincidently. Carcinoma of the fundus in combination with a fibroid is usually given as being two and a half times more frequent than cervical carcinoma and fibroids, and Noble[1] found this true in the 1188 cases of which he has records. He attributes marked significance to this observation because in women not the subject of fibroids cervical carcinoma is about four times as frequent as corporeal carcinoma. Kruger found in Winter's cases fifteen times a combination with cervical carcinoma, and only eight times with corporeal carcinoma.

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[1] Zeit. f. Geburt. u. Gynäk., 1904, Bd. lii.

[2] Deut. med. Wochenschrift, Bd. xxx. Nr. 14.

[3] Inaug. Dissert., Würzburg, 1902; Referat: Zent. f. Gynäk., 1904, Nr. 5.

[4] Revue méd. de la Suisse Romande, 1904, 4; Referat: Zent. f. Gynäk., Nr. 44.

[5] Archiv f. Gynäk., Bd. lxxii.

[6] Inaug. Dissert., München, 1903; Referat: Zent. f. Gynäk., 1904, Nr. 11.

[7] Deut. med. Wochenschrift, Bd. xxx. Nr. 14.

[8] Zeit. f. Geburt u. Gynäk., 1904, Bd. lii.

[9] American Medicine, vol. viii. No. 11.

INDICATIONS FOR RADICAL TREATMENT OF FIBROMYOMA. The uselessness of any other form of treatment than the operative has recently been dwelt upon by Knapp,[2] while Muret[3] insists that every case must be judged for itself. The social state of the patient and the position of the tumor will often determine the question of operation. Hauber believes that only those myoma which can be kept under constant observation and which either remain the same size or grow smaller are suitable for palliative measures. Pfannenstiel gives the following indications for operation:

1. Tumor larger than a man's head; in younger people, smaller growth, especially if they are multiple.
2. Pain.
3. Hemorrhage.
4. Deep-seated, eccentric myomata, especially subvesical or intraligamentary.
5. Pedunculated, subserous tumors, which show a tendency to torsion of the pedicle.
6. All rapidly growing tumors.
7. All complicated cases, in which the myoma has produced the complication.

Noble, from a study of 1188 carefully observed cases reported by Martin, Cullingworth, Frederick, Scharlieb, McDonald, Hunner, and himself estimates that from degeneration occurring in the tumor itself 16 per cent. of the patients, and from the complications outside the uterus and tumor, 18 per cent. of the patients would have died if not subjected to operation. "Taking them as a whole," he says, "at least a third of the women would have died had they not been operated upon." He holds that the scientific position in reference to the indication for fibroid tumors is that as these facts are incontrovertible—being based on careful clinical and pathological investigations—the indication for operation should be based on these facts, and not on any particular symptom which may be present at the time the woman comes under observation. His position is distinctly in opposition to that which may be called the classic or traditional position, which is that the operation to remove a fibroid tumor should be done because of the symptoms the tumor is producing at the time the patient presents herself for treatment, whether this be hemorrhage, pain, or pressure on the urinary organs or on the alimentary canal, or whether it is a state of mind arising in the patient because of her knowledge of the existence of the tumor. Further on in his article Noble says: "To speak by analogy, a fibroid tumor should be removed for the same reason that an ovarian tumor should be removed; the indications varying in degree, but not in kind. Ovarian tumors are removed irrespective of the symptoms they are producing, because of the knowledge of the life history of these growths, which is, that if left to pursue their usual development, a fatal result will occur in most all cases. Similarly, fibroid tumors should be removed because if left to pursue their usual development in at least a third of the cases a fatal result will occur."

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[1] American Medicine, vol. viii. No. 11.

[2] Berliner Klinik., Heft 191.

[3] Revue Méd. de la Suisse Romande, 1904, 6; Referat: Zent. f. Gynäk., 1904, Nr. 44.

Notwithstanding the excellent paper which Noble has presented in favor of the immediate removal of a fibroid tumor after it is discovered it is my feeling that were this rule to be generally accepted a great many patients would be operated upon unnecessarily and therefore in the end the policy would work harm rather than good. Were this policy solely confined to the best abdominal surgeons the matter might be somewhat different, for the mortality under these circumstances would be extremely small. In these cases, however, there is an equally great problem to be considered, and that is the effects of the radical operation upon young women in whom fibroid tumors are not infrequently discovered. Many of these cases go on indefinitely without serious symptoms, and to entirely ignore the question of symptoms and institute a universal principle of operation as quickly as a tumor is discovered is hardly advisable.

As has been shown in the preceding pages, the transformation of a fibroid to a malignant tumor is very rarely noted, and also many of the minor degrees of associated inflammatory diseases of the ovaries and tubes at most only give discomfort and at no time seriously threaten the patient's life. Therefore, it would seem that with the knowledge which we already possess concerning the clinical history of these cases and the fact that they do not, except in rare instances, produce sudden or alarming symptoms, we can still hold to the old or classical indications for operation. In the foregoing pages Pfannenstiel has laid down a rather extensive number of indications for operation, but the chief ones which usually become manifest and may be at once noted by any physician are: 1. Hemorrhage. 2. Malodorous discharge. 3. Pressure symptoms referable to the bladder and rectum. 4. Pain. 5. Rapid growth of the tumor. 6. Continuous dwelling, by the patient, upon the fact that she has a tumor. Concerning the latter indication, a patient is occasionally found who, notwithstanding she is assured that the tumor is producing no trouble, and is not likely to give rise to danger symptoms in the future, becomes morbidly introspective, through dwelling upon the fact that she has a tumor. She continually worries about it, and falls into a neurotic state which may demand the removal of the tumor to relieve this serious mental perturbation.

CARDIAC COMPLICATIONS OF MYOMA UTERI. The cardiac changes in cases of myoma are not well understood, although this complication may suddenly defeat what would otherwise have been a successful operation. A patient subjected to operation for a myoma may perish at its close from progressive weakness of the heart, or the diminished cardiac force may predispose to septic infection, or it may lead to thrombosis of the femoral or pelvic veins and this in turn to pulmonary embolism. Fleck[1] has collected 325 cases of myoma in which an examination of the heart was noted, and he finds that in 133 of these, or 40.9 per cent., there was some pathological cardiac condition. His figures agree remarkably with those of Strassman and Lehmann, who found a percentage of 40.8.

Relative to the etiology of the cardiac complication, the influence of hemorrhage may at once be excluded, for in the 133 cases collected by Fleck, in 34.6 per cent. this symptom had not been present. Brosin in 1894 pointed out that myocardial degeneration in diseases marked by continual loss of blood, other than myoma—*e. g.*, carcinoma, etc.—did not occur. Strassman and Lehmann, after a study of 71 cases from the clinical standpoint, concluded that the cardiac condition, or at least an alteration of the entire vascular system, was the primary occurrence and the direct cause of the myoma. Kessler, on the other hand, after the study of a complete autopsy upon a case of fibroid tumor, believed that the heart affection was due to an increase of aortic tension from circulatory difficulties induced by the tumor.

There are objections to both of these theories. So long as the cardiac change is confined to the myocardium it is unlikely that it is idiopathic and that it antedates the formation of the tumor. On the other hand

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[1] Archiv f. Gynäk., 1904, Bd. lxxi. Heft 1.

Kessler's position is not well taken, for if as the result of interference with the circulation an increase of arterial tension were to occur, it would quickly be compensated for by the dilatation of neighboring anastomoses, and therefore would not lead to an increase in the aorta. In contracted kidney, for example, it is not mechanical interference with the circulation in the organ that produces an increase in aortic tension, but a circulating toxin which contracts the smaller arteries and thus increases the tension of the entire arterial system. The author finds from a study of 12 cases at autopsy that the usual cardiac lesion is brown atrophy. In one of Kessler's cases the condition resembled the "myofibrosis cardis" of Dehio. The cardiac complication usually manifests itself clinically as a relative insufficiency. It resembles myocarditis more than any other condition, although it is not identical. The author takes it as an established fact that the degeneration of the heart muscle in myoma is caused by a toxin. That this toxin is a metabolic product from the myoma itself is an impossible conception, for while malignant tumors produce toxins, there is no reason whatever to believe that fibroid tumors are malignant in the ordinary accepted sense. While a few cases of apparent metastases have been reported, all are open to doubt. Furthermore, even in cases of the smallest tumors the heart disease may be very grave and the growth of these tumors is usully so slow that it is hard to conceive of enough metabolic activity in them to produce a toxin. Whence then comes the toxin? Fleck suggests that it may be some poison which affects both the heart and the uterus at the same time, producing in one the myocardial degeneration and in the other a myoma. He next draws attention to the tendency to adiposity of myoma patients (in 325 cases 41 were very fat). This is easily explained by the anæmia and the enforced rest in bed necessary in some of the worst forms of myoma. This observation, however, is offset by the fact that in 41 cases there had been no bleeding in ten instances. He believes, therefore, that there is some direct influence, aside from anæmia, which favors the accumulation of adipose tissue. Attention is called to the frequent accumulation of fat at the menopause and after castration, and experiments and investigations are cited to prove the existence of an internal secretion of the ovary which may hold this tendency in check. Thus Loery and Richter have shown that there is a diminution of the exchange of oxygen after castration.

The author next draws attention to the frequent association of ovarian disease with fibroid tumor of the uterus, and to the influence which castration occasionally has upon the growth of these tumors. He also observes the serious pathological lesions which may be caused in the heart through the perverted activity of a gland with an internal secretion (exophthalmic goitre). Fleck is inclined to believe, therefore, that the cardiac condition found in myoma is part of a general process which originates in a pathological state of the ovary.

We have reviewed Fleck's paper because it covered the literature and not because we are inclined to agree with him. The trouble with so many writers is that they try to bring the etiological factors of a disease within narrow lines to fit their own especial theory, to the exclusion of all others.

Fibroid tumors of the uterus are, without much doubt, of congenital origin. The accompanying disease of the adnexa is but the result of accident or the mechanical insults to which they are subjected. The heart weakness in myoma, whatever it may be, is certainly the result of several causes—viz., anæmia, accumulation of fat, and disturbance of the circulation. That there are exceptions to all of these is no doubt true, as—*e. g.*, myoma heart without hemorrhage. But a myoma not causing hemorrhage at one time may have caused it at another. That 41 women in 325 should show a tendency to adiposity is not so startling, for this is a very common tendency in middle-aged women.

CHOICE OF OPERATION. After the decision is reached to operate upon a fibroid tumor which gives symptoms, interest centres in the variety and technique of operation. It is much easier to perform a supravaginal hysterectomy than any other operation for the removal of these growths, and likewise it is less difficult to remove the ovaries with the uterus than to conserve them. The propriety, therefore, of the conservative policy depends upon the necessity for avoiding an early surgical menopause. The advantage of myomectomy over hysterectomy lies in the preservation of fecundity and in the continuance of the menstrual flow. There seems to be added risks, however, in myomectomy, and the operation is usually more difficult than hysterectomy, and both mortality and morbidity are greater following this operation than the more radical hysteromyomectomy. The conservation of the ovaries also, although not difficult, adds to the duration and slightly complicates the technique.

Incidentally we may say that this discussion does not apply to simple submucous or subperitoneal pedunculated tumors which, without question, should be dealt with by myomectomy.

According to Winter[1] only in recent years has myomectomy been applied to interstitial and sessile subperitoneal growths. This has arisen from an increased predilection for conservative surgery, and is the development of a surer asepsis and a better technique. There are many differences of opinion to-day relative to the propriety of myomectomy, and the question is often unfairly treated because different surgeons take a position primarily for or against the operation, and refuse to consider the question from any other standpoint. It is only through an unprejudiced examination of the question that it can be decided.

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[1] Zeit. f. Geburt. u. Gynäk., 1904, Bd. li.

In the absence of the uterus with continued activity of the ovaries, Winter believes there may be disagreeable menstrual molimina with perhaps vicarious bleeding. Glaevecke states that disagreeable sensations not infrequently do occur in the menstrual periods, but these symptoms gradually grow less, and after two years disappear. The psychical effect upon the patient is of more moment and is often intimately connected with the woman's idea of her own well-being and womanliness. The importance of this, of course, depends upon the age of the woman, her maternal desires, sexual proclivities, etc.

Zweifel, Mackenrodt, and others believe that the disappearance of the menstrual flow in itself has a physical influence upon women, and is a factor in painful molimina. Werth has noted a case of painful menstrual molimina with retention of the menstrual flow, and Henkel has observed two similar cases. Moreover, these symptoms have not been known to follow destructive atmocausis of the endometrium, when of course menstruation entirely ceases.

Pfannenstiel says the psychical effects of the surgical menopause may be obviated if the patient is instructed correctly concerning the significance of its cessation. If in exceptional cases the psychic influence is especially to be expected, he concedes that the treatment may be modified accordingly.

Menge[1] thinks it is important to preserve the menstrual flow because upon it so intimately depends the general nervous equilibrium of a woman. It is hard to convince many patients that they are not in a serious physical state without the occurrence of the menstrual function. Many regard it as a cleansing process which must be maintained until the menopause. When artificial cessation occurs they feel that they have lost their *facultas generandi.* This is of no small moment regardless of Pfannenstiel's remarks concerning her education and instructions relative to the harmlessness of this event. Frequently there develops more or less severe functional neuroses, neurasthenia, hypochondriasis, or a mixed neurosis depending upon the individual.

With all these observations for and against conservatism, the question arises, Does it pay to conserve the ovaries after hysterectomy? From a collective study of many operations, Winter concludes that in about 12 per cent. of cases there will be an early climacterium, even though the ovaries have been preserved. This may be blamed to the atrophy of these organs subsequent to hysterectomy, because of interference with their blood supply, or to operative manipulation. The author doubts, in view of this fact, whether the conservation of the ovaries after hysterectomy is advisable. Upon this point we must take issue. Some authors agree that it makes little difference to the woman whether her menopause occurs a few years earlier than normal, claiming that her symptoms are no worse than they would be at the proper time. Others have seen distressing results from this premature climacterium. As noted by Winter, in 12 per cent. of these cases the ovaries soon atrophy in the absence of the uterus, and the premature menopause occurs in spite of their conservation. Because in only 12 per cent. of cases Winter has noted the onset of the menopause shortly after the performance of the operation is no argument whatever against the conservation of the ovaries in these cases. In the first place, as he himself admits, this atrophy is doubtless due to a defective technique in the operation. If the ovarian bloodvessels are preserved, as they can be in all cases where the conservative operation is performed, there need be no atrophy following this operation, and, as my own experience shows, the patient will be much more comfortable than if there is a total ablation of the generative organs. As will be seen from the subsequent paragraphs, it is evident that the consensus of opinion is in favor of rather than against the preservation of the ovaries.

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[1] Archiv f. Gynäk., Bd. lxxii.

Zweifel recommends partial resection of the uterus because of the supposed effect the uterine body exerts upon the nutrition of the ovaries. Werth and Olshausen believe the ovarian activity depends largely upon the preservation of a good blood supply which, if care is not taken, may seriously be interfered with during operation.

Pfannenstiel says that, from a physical standpoint, when the ovaries are preserved there are, as a rule, no untoward symptoms, and if, as sometimes occurs, the ovaries gradually atrophy, even in the worst cases the artificial climacterium is no worse than that the woman would naturally experience sooner or later.

It is plainly evident that the experience of various authors with regard to painful menstrual molimina, and the artificial menopause after the radical and after the conservative operation is nearly diametrically opposed. While these symptoms are not regarded as having the greatest significance, still it cannot be denied that they must to some extent influence the choice of operation. Henkel thinks that in accounting for the conflicting experiences of operators too little attention has been paid to the size of the extirpated tumor. It is frequently found that no painful menstrual molimina follow hysteromyomectomy when the uterus is small, whereas they are most pronounced after the uterus has grown to a considerable size. The exact point beyond which the size of the uterus is capable of influencing the postoperative states cannot be given absolutely, because in each case there are individual influences which cannot be estimated. In cases of large tumors, Henkel has seen distressing symptoms follow operation, and it seemed to make little difference whether the ovaries were removed or not. Abel and Winter have had similar experiences.

The whole question in view of these apparently contradictory results is a perplexing one. The symptoms, as a rule, differ materially from those of the normal menopause. Henkel carefully questioned 21 patients (selected indiscriminately, exclusive of myoma patients) with regard to the menopausal symptoms, and found that they rarely continued for more than a half to one year, and only rarely caused much suffering. In myoma patients, however, the climacterium occurred on the average five years later; when it did appear there was perhaps more bleeding, but otherwise the symptoms did not materially differ from those in other women. When the myoma had been enucleated at an earlier period the menopause arrived at the usual time, and the case differed in no way from the normal. The author has observed that in those cases of myoma which are so situated in the wall of the uterus (interstitial) that there is a considerable hypertrophy of the muscularis, the ovaries are enlarged and succulent; whereas, in those tumors of the subperitoneal and submucous (pedunculated) variety, the ovaries show no change. He believes that the entire explanation of the difference in the induced menopause in these cases lies in the influence exercised by the uterine body, and in the proper balancing between its internal secretion and that of the ovary. He does not believe in the necessity of menstruation, and has never seen these untoward symptoms follow myomectomy when the uterine body is preserved. To say the least, Henkel has done a deal of theorizing, with a very limited range of observations to sustain his theories.

PREGNANCY FOLLOWING CONSERVATIVE OPERATIONS. How often, Winter asks, does pregnancy follow a conservative operation? Including cases which he has followed subsequent to operation, and excluding those over forty years of age, and those because of their social state in whom there was no probability of impregnation, he finds: In 18 cases of myomectomy for submucous myomata 4 conceptions, 22 per cent. In 5 cases of myomectomy for pedunculated subserous myomata, 1 conception, 20 per cent. In 5 cases of myomectomy for subserous interstitial myomata, 1 conception, 20 per cent. In 37 cases of pregnancy following myomectomy, 26 (72.97 per cent.) went on to term. He finds 3 cases (Winter, Amann, and v. Guerard) following operation in women previously sterile. These statistics are, therefore, triumphs for conservatism. Of 46 labors following conservative myoma operations, all were normal except 6, and only 1 of these, a case of Müller, of adherent placenta, can in any way be ascribed to the previous operation. From his statistics he concludes that (*a*) in women under forty years of age, pregnancy may occur after the removal of subserous and submucous tumors, and of interstitial tumors if they are small; but if larger than a child's head it is very unlikely (*b*) pregnancy after myomectomy usually goes to term in the absence of complications independent of the operation; (*c*) there is no difficulty in labor traceable to the scar in the uterine wall.

Henkel has had 3 cases in his series of 40 myomectomies. It is easy to see how the removal of a myoma might do away with a mechanical obstacle to impregnation. In one of Henkel's cases conception had not occurred, although the woman had been married for a year. The danger of intrapartum rupture of the uterus following myomectomy, so much dwelt upon by a few writers, is practically *nil*, provided the pregnancy begins after the operation. If pregnancy exists at the time of operation, the danger is pronounced and proportionately greater as the time of the operation approaches the time of labor. Henkel believes, however, that in most cases of fibroids the question of pregnancy is not important because these women are usually near the menopause. In a young person, however, it is most important to avoid a mutilating operation for myoma, with a view to the preservation of the childbearing function. In his opinion, Winter's solicitude for the uterus left after myomectomy in its thickened hyperplastic state, when all palpable and visible growths have been removed, is unfounded. The uterus in a surprisingly short time returns to its normal size, and Henkel has never noticed any aggravated symptoms traceable to the uterine mucosa, even when serious hemorrhage from the endometrium had been the chief indication for operation. If in consequence of metritis or endometritis hemorrhage should persist, he does not think it is an argument against the conservative operation, because it can be cured by simple curettage. According to Pfannenstiel the question of subsequent pregnancy also deserves little consideration. Most of the cases occur in virgins beyond the age of thirty, who have no view of marriage, or in women with impotent husbands. Sterility is even an etiological factor in myomata. As a rule, he considers only those cases suitable for myomectomy in which the tumor is submucous and pedunculated or subserous and pedunculated.

Are a patient's symptoms relieved as perfectly by a conservative as by a radical operation? This is considered by Winter from three standpoints:

1. Relative to the recurrence of the myoma.
2. Relative to the relief of symptoms.
3. Relative to the general health of the patient.

In 2000 cases of radical operation reported by Abel, Burkhardt, and Schenk:

(*a*) There was no recurrence of myomata.

(*b*) Ono hundred and eighty-eight patients were entirely relieved of their symptoms.

(*c*) One hundred and ninety-five were in excellent general health and fully satisfied with the result.

In comparing this result with the results of myomectomy, the author excludes submucous myomas removed per vaginam, and includes only cases of interstitial and subperitoneal growths in which laparotomy or colpotomy was performed and opportunity afforded to recognize and remove all the fibroid nodules. In 61 such cases there were 3 recurrences, and in 17 of the author's cases there were 2 recurrences, a percentage of 6.4. If the submucous tumors are included the percentage reaches 8. The recurrence of a myoma after myomectomy, requiring a second operation, therefore, is a strong argument in favor of radicalism.

In cases of myoma uteri, which do not so imperatively require operative interference as carcinoma or an ovarian cyst, the relief of the patient is very essential if she is to undergo the danger and suffering incident to the operation. If relief is not perfect, or entirely fails, the operation falls short of its purpose. As seen above, after 94 per cent. of radical operations, the symptoms were fully relieved. In a carefully selected series of 69 cases of submucous myoma, 27.5 per cent. were not relieved; in 16 cases of subserous pedunculated growths there was a recurrence of symptoms in 37.5 per cent.; of 11 cases of subserous interstitial growths, 45 per cent. continued to suffer. These comparatively poor results may be accounted for by the fact that after myomectomy the uterine musculature frequently is the seat of vascular changes, hyperplasia, and chronic inflammatory changes. Pathological changes in the mucosa incident to the growth of the tumor produce symptoms which lead the patient to seek relief.

With respect to the general health of the patient, and her satisfaction with the results of the operation, Winter finds that 73 per cent. of myomectomies are symptomatically cured, contrasted with 97.3 per cent. following radical extirpations. From these figures the author concludes that in every respect the radical gives far better results than the conservative operation. Henkel reminds us that Winter found from his own cases and those of Engström a recurrence of subserous interstitial growth after myomectomy in 6 to 7 per cent. of cases. Winter says, however, that in but a single case was there a recurrence of symptoms sufficient to require further treatment. Although the age of Winter's cases was not given, Henkel believes that the average time between the first operation and the recurrence, which is given as six years, would bring these patients to or beyond the menopause, when the myoma would have but little serious significance. The author knows of but 5 recurrences in his own experience after abdominal myomectomy. In 2 of these it was evident at the operation that some of the myomata remained but none of these women had any subsequent suffering and the result of the operation was satisfactory. Because of these recurrences, Winter agrees with Fritsch in looking upon myomectomy as a failure. Henkel quite properly says that there is no more reason for this attitude than there would be in considering operations for prolapsus or the Alexander-Adams operation as failures because there are occasional recurrences, for there is no operation which is invariably perfect in its results. The possibility of a second operation, although seldom required, does not detract from myomectomy, and the danger of a second operation ought not to be overestimated. Furthermore, myomectomy serves a good purpose when it relieves the patient of her suffering, and she may be assured that no new distressing symptoms are to follow as its sequel.

With regard to the relief of symptoms following the various operations and the subsequent capacity for work, Henkel believes the *status presens* of the patient is best determined through personal questioning. He found after the radical operation that heavy work, which had been performed previous to the operation, even though the patient was suffering at the time, was no longer possible after it. After the conservative operation this was not the case; and not only were the symptoms directly attributable to the myoma, as hemorrhage and vesical pain, relieved, but also those of less intimate relationship, such as cardiac distress, shortness of breath, and nervousness. Vaginal discharge has been observed after both operations. The pain which is occasionally noted after myomectomy may be attributed to an exudate which has not been absorbed. This, however, is frequently observed after supravaginal hysterectomy and after other radical operations. In opposition to Winter the author concludes that the results of the conservative operation are better than those of the radical.

Which operation gives the better primary result? It goes without saying, observes Winter, that one should always select the operation least dangerous. Only when the permanent result is of as serious import to the patient as the immediate result is it permissible to select an operation of greater danger, but one affording better chances of ultimate recovery. In his opinion the maintenance of menstruation, the possibilities of subsequent pregnancy, and the avoidance of the artificial climacterium are too trivial to justify myomectomy if this operation is more dangerous. From the statistics of Hofmeier, v. Rosthorn, Wyder, Carle, Wertheim, v. Ott, Martin, Heinricius, Olshausen, Thorn, Engström, Tuffier, Schauta, Zweifel, Weider, Fritsch, Amann, Chroback, Bumm, Leopold, Pfannenstiel, Döderlein, Burkhardt, and his own, Winter finds: In abdominal myomectomy of subserous interstitial growths a mortality of 9.8 per cent. In abdominal supravaginal hysterectomy a mortality of 4.8 per cent. The conservative removal of submucous and pedunculated subserous myomata is without danger. Menge reports 80 abdominal myoma operations as follows:

1. Supravaginal hysteromyomectomy, after Zweifel	12
Recoveries	11
Death (from cerebral embolism)	1
2. Panhysterectomy	8
Recoveries	8
3. Abdominal panhysterectomy, after Faure-Kelly-Kroenig, splitting of uterus	15
Recoveries	13
Deaths	2
(One death occurred from pulmonary embolism and the other from sepsis following hemorrhage.)	
4. Abdominal panhysterectomy, after Doyen	21
Recoveries	21
5. Abdominal myomectomy	19
Recoveries	19
6. Incomplete operation	3
Recoveries	3

Although the radical operations in Menge's hands have, up to the present time, outnumbered the myomectomies 3 to 1, the mortality of the latter has been *nil.* The author has purposely employed a variety of operations so that he would be able to judge for himself of their relative advantages. With Henkel he asks whether myomectomy is not followed by as good primary results as supravaginal hysterectomy. Henkel bases his query upon the personal examination of 90 myoma patients, in 40 of which abdominal myomectomy and in 50 supravaginal hysterectomy had been performed. He does not believe in vaginal enucleation if the tumor is of any size, on account of the likelihood of mangling the uterus, and the uncertainty of hæmostasis when the uterus is replaced in the pelvis. It has been said, and rightly so, that abdominal myomectomy up to the present time is a more serious operation than the abdominal radical extirpation. Winter notes a mortality after enucleation of 9 per cent., and says that in one-quarter to one-third of all cases there is some disturbance in convalescence. In the hands of unskilled men, the author believes these proportions would be even higher. It is his opinion, however, that with improved technique the convalescence after the abdominal enucleation will be equally as good as after the radical operation. In the way of improving the technique he strongly insists that there should be no intrauterine manipulation for a number of days preceding operation, so that the uterine cavity may be sterile, and that there may be no abrasions of the mucosa. Even the most skilful hand, he believes, may penetrate the mucosa with a sound and introduce infection into the uterine wall. In cases where intrauterine exploration is required, he recommends a digital examination under narcosis. If it is found at any time that myomectomy is indicated, the surgeon should delay the operation several days in order that the uterus may clear itself of any infectious matter. At the time of operation the patient should be placed in the Trendelenburg position, and after the incision is made the uterus should be delivered through the incision while the intestines are protected with gauze. The hands should not directly touch the uterus or the tumor during the enucleation, the various manipulations being made with instruments. The uterine muscle is incised over the tumor, and the entire myoma is dissected out of the musculature without cutting through its capsule at any part. The wound is closed from the bottom with fine catgut, which is not touched by the hands. The serous borders of the incision should be inverted slightly by the outer suture. To prevent serious hemorrhage, the uterine arteries may be compressed by forceps, or by an assistant who grasps the arteries between pieces of gauze. Care should be taken to make as neat an incision as possible, and, in case of multiple myomata, as few incisions as possible. The author has not found it a serious complication if the uterine cavity is opened, provided care has been taken to render it aseptic. His reasons for not shelling the myoma out of its capsule are these: the capsule is usually rather thick and poorly vascularized, and it is more difficult to obliterate by sutures such a cavity than one left in the softer, more vascular uterine tissue. If the bed of the tumor is not completely obliterated blood may collect therein, and in the presence of infection forms an excellent culture medium. In the event of hemorrhage after enucleation the blood is much less quickly absorbed when it is confined to the thickened, poorly vascularized capsule. The author has frequently found in the microscopic examination of the capsule of myomata small fibroids, which increase the dangers of recurrence if this structure is left behind.

Menge believes that enucleation has a technical advantage in many cases. The danger of injuring the bladder, ureter, or bowel is eliminated, which cannot be said of the radical operation. He cites the following objections to myomectomy which have been made by its opponents: 1. The further growth and development of undiscovered nodules. 2. The possibility of excessive hemorrhage during the operation. 3. The possibility of hemorrhage into the bed of the tumor following operation and the subsequent infection of the blood coagulum. 4. Air embolism from the bed of the tumor. 5. Weakness of the uterine wall after myomectomy predisposing to rupture of the uterus in a subsequent labor.

Relative to the last objection, it may be said that many of those who dwell upon the possibility of uterine rupture following myomectomy negative their argument by asserting that pregnancy is as good as out of the question after myomectomy. In order to eliminate as far as possible the other objections and dangers of this operation, Menge offers certain improvements in technique. In the first place he renders the field almost bloodless by ligating the vessels which supply the particular area in which the tumor is found. In the second place he takes great care in obliterating the bed of the myoma and closing the peritoneal surface at the uterine incision. Thus, for growths occupying the uterine wall at the fundus, he places ligatures around the branches of the uterine artery supplying the uterine wall. These are introduced medially from the point of origin of the vessels and never include the cervical branch, nor is the anastomosis with the tubal branch of the ovarian artery disturbed. This method of ligation will materially lessen the amount of blood sent to the uterus, while it will have no effect upon the tubes and ovaries. There is also no tendency to necrosis and no disturbance in the healing of the uterine incision. Menge has never seen any bad result from this procedure. He has never observed a case of pregnancy following operation and is, therefore, unable to say what would occur in this event. If the tumor is intraligamentary all the vessels of that side of the uterus must be tied, which includes all of the uterine branches and those supplying the broad ligament in the passage of the uterine artery through that structure, the artery of the round ligament, and the ovarian artery. In case the location of the tumor makes the application of these sutures difficult or impossible, it is better to enucleate first and tie afterward, or to abandon the conservative operation and perform a hysteromyomectomy. At any rate, one should always observe the condition of the ovary on the opposite side before tying off one broad ligament. In case the adnexa are diseased they must be removed, although Menge is a firm believer in the conservation of as much ovarian tissue as possible.

By thus shutting off to a great extent the afferent and efferent blood supply to the bed of the myoma, Menge avoids hemorrhage during operation, makes it impossible for air embolism to occur, and is able quickly and carefully to catch all spurting vessels in the bed of the tumor, and obliterate the latter by careful suturing with fine catgut. The peritoneal borders of the incision are inverted and united by a buried catgut suture, thus leaving no line of raw tissue to which the bowel might become adherent. The author strongly favors abdominal myomectomy instead of vaginal myomectomy. When myomectomy is impossible, then Zweifel's supravaginal amputation is performed. Menge prefers the Doyen panhysterectomy for the abdominal operation, and one or both ovaries are always conserved whenever possible.

There should be no rule of thumb in the choice of either the radical or the conservative operation. Both Menge and Henkel are strong advocates of the less radical myomectomy, and Menge's suggestions are invaluable in the improvement of the technique of myomectomy. On the other hand, Winter's conclusions which follow are most logical. They are:

1. Myomectomy preserves menstruation.

2. Myomectomy makes possible subsequent pregnancy in women under forty years of age. This most often occurs after the removal of submucous and subserous growths. It is very unlikely to occur after the enucleation of subserous interstitial growths larger than a child's head. The pregnancy goes on to term and the labor is easy if the genitalia are otherwise sound.

3. Myomectomy guards against artificial menopausal symptoms which occur in 12 per cent. of radical operations (conservative-radical, one or both ovaries left after hysterectomy).

4. Myomectomy, even if every visible and palpable tumor is removed, does not guard absolutely from recurrence. When a secondary radical operation is required the conservative operation must be looked upon as a failure.

5. Myomectomy does not surely relieve the suffering of the patient.

6. Myomectomy by the vaginal as well as by the abdominal route gives worse immediate results than the radical operation.

As the result of this investigation Winter lays down the following rules:

1. Pedunculated subserous tumors, when the uterus is free from other nodules, submucous polypoid growths, and huge myomata which cause an enlargement of the uterus up to the umbilicus or above that point (and which may be removed in several sittings from below), unless the uterus is fixed, should be subjected to myomectomy.

2. Sarcoma or myoma complicated by carcinoma must be treated radically.

3. In the following cases a choice must be made to suit the individual condition:

(*a*) The sessile subperitoneal growths.

(*b*) The purely interstitial growths.

(*c*) The sessile submucous growths when the cervix is entirely closed.

(*d*) Multiple myomata of different forms.

Myomectomy has but an individual and conditional advantage.

The patient, not the physician, can estimate its value. In particular cases it may profoundly influence the subsequent life of the patient, while in others all that is gained by the myomectomy is of absolutely no value to the patient. Therefore, in deciding between a radical and a conservative removal the patient should have the situation explained to her and should decide the question, judging it according to the value she places upon the continuance of menstruation and the possibility of conception.

With regard to the choice of operation for fibroids in pregnancy, the author from his own and the statistics of others favors myomectomy. He finds that this operation is not more dangerous during pregnancy, and it has the further advantage of preserving the child's life in 75 to 80 per cent. of cases.

Pfannenstiel does not approve of the enucleation of large interstitial growths, multiple tumors, or adenomyomata, believing that they should be treated radically without regard to the function of the uterus. In these cases he employs either abdominal supravaginal hysterectomy or complete vaginal hysterectomy. He advocates the conservation of the ovaries, or at least one ovary in every case before the menopause. In his opinion the occasional suffering which may arise from the conserved ovary is as nothing compared to the symptoms of the artificial climacterium observed after castration. As to the choice of operation, the abdominal is preferable in case the tumor is large or there are adnexal complications. There is no doubt that a patient suffers less after a vaginal than after an abdominal hysterectomy, but in extenuation of the abdominal hysterectomy it may be said that there is no doubt that this operation is selected in the severest cases, and therefore the post-operative results are not comparable upon an equitable basis.

Pfannenstiel has had 6.5 per cent. mortality in 108 abdominal operations as compared to a mortality of 4.05 per cent. in 43 vaginal total extirpations.

Prolapsus Uteri. Bürger[1] finds a cause of prolapsus in defective innervation of the muscles of the pelvic floor and thus accounts for some of the cases seen in young primipara. He notes a number of instances of congenital prolapsus associated with spina bifida, in which malformation of the sacral plexus had prevented the proper development and functional activity of the pelvic floor.

G. Winter[2] states that 2.5 per cent. of 243 prolapsus cases collected by Götz occurred in women who had not borne children. The processes of pregnancy, labor, and the puerperium are, of course, the chief causes of prolapsus, and if every puerperal woman was carefully examined at the end of the childbearing cycle the predisposing factors to a prolapsus would usually be discovered.

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[1] Archiv f. Gynäk., Bd. lxxii. Heft 2.

[2] Sammlung. zwangl. Abh. a. d. Geb. der Frauenheilk. u. Geburtsch., Bd. v Heft 8.

Senile involution is also a frequent cause. This affects principally the muscular and fatty tissues, and as it is unavoidable, prophylaxis plays no part in its prevention. This author lays little stress upon trauma or straining as causes of prolapsus. While it is true that an accidental trauma may directly precipitate this disability, as a rule it only makes evident a previously latent prolapsus, or precipitates symptoms. Thus, severe exertion, heavy lifting, and frequent coughing in the presence of relaxed tissues from senility or childbirth may directly lead to a prolapsus. Unless the traumatism is severe enough to produce an actual rupture of the uterine supports it is not sufficient to produce a serious downward descensus. This may be demonstrated upon the cadaver, for a prolapsus may only artificially be produced by cutting some of the uterine ligaments.

With regard to the etiological influence of childbirth, the author notes that while a perinea' tear may be united by an immediate perineorrhaphy, it is difficult to restore the vagina by an operation if it is pushed down and separated from its pelvic attachments. If this detachment is subcutaneous it may not be detected until after the patient has been on her feet for some time. The early use of the forceps and excessive bearing down by the patient are predisposing influences in the dislocation or detachment of the vaginal tissues. The author, therefore, offers the following prophylactic cautions:

1. Never encourage a patient in labor to bear down until nature excites this inclination.

2. The use by the patient of tractors to increase the voluntary expulsive effort is questionable.

3. Never apply forceps without a complete dilatation of the cervix. When a more precipitate delivery is necessary it is best to incise the cervix.

4. Never use forceps without a positive indication. Secure the gradual passage of the head through the vagina and over the perineum.

5. Carefully suture every perineal laceration immediately after labor.

During the puerperium:

1. Avoid overdistention of the bowel and the bladder.

2. Keep the patient in bed twelve to fourteen days and caution her against hard work for six weeks.

Examine the patient six weeks post-partum for any descensus. The author offers several objections to the use of the *pessary:*

1. It keeps the vaginal walls on tension and causes overstretching; and although it may correct the displacement for the time being, the relaxation becomes progressively worse.

2. It acts as a foreign body in the vagina and may produce ulcers, discharge, and inflammatory affections about the uterus and the vagina. Even though douches are systematically employed and the pessary is occasionally removed, a patient can scarcely undergo the pessary treatment for a year without having some untoward local effect.

3. It requires time, trouble, and money for the patient's cure. At the present time a pessary is used by Winter only when an operation is contraindicated.

His contraindications to operation are:

1. Extensive prolapsus in badly nourished patients or in those with chronic visceral disease.

2. Very early cases of retroversio flexion with vaginal descensus. Here suitable measures may cure the disability without operation.

Retroversio Uteri. The various malpositions of the uterus are a perennial source of discussion, and while perhaps the gynecological world is approaching somewhat nearer the solution of the treatment of these cases, nevertheless there are as yet very divergent opinions concerning several questions at issue. The symptoms directly emanating from a retroflexion as well as the operative treatment will again be taken up in the following pages.

SYMPTOMS AND INDICATIONS FOR TREATMENT. Graefe[1] represents a class which opposes, or rather limits, the surgical treatment of these cases. He claims that the simple retroposition of a normal uterus requires no treatment, and the symptoms from which these patients usually complain are not referable to the malposition. In such cases a careful history and a general examination will usually reveal chlorosis and hysteroneurasthenia. The latter conditions should be treated and the patient should be kept in ignorance of her condition. Only when the patient knows she has a displacement and has a fixed idea that she will never be well until it is corrected should an operation be undertaken. In such a case the Alexander operation is advisable.

The operable cases are those in which there is persistent sterility or in which the uterus and its appendages are adherent, and in some instances when the retroposed uterus is enlarged, hyperæmic, sensitive, and there is associated prolapsus of the ovaries.

Relative to the treatment of a retroposed, pregnant uterus, he believes it is not always necessary to even replace it, but if the patient cannot be kept under constant observation, and especially if the fundus is situated deep in the pelvis or if there are symptoms of incarceration, or in cases in which there have been repeated miscarriages, the uterus should be replaced and held temporarily by a pessary. If the retroposed, pregnant uterus is adherent and attempts at replacement are ineffectual, this serious disability should be corrected by operation.

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[1] Sammlung. zwangl. Abh., Bd. v. Heft 2

Skutsch[1] is likewise in accord with the opinion that a retroposition may have no clinical significance, as, for instance, virginal retroposition and retroposition of a senile uterus. He emphasizes the necessity for careful study of these cases, and especially speaks of the difficulty of determining in neurotic women whether the retroflexion is an accidental coincidence or whether there is a definite relation of cause and effect.

Nacke[2] has examined 265 cases with reference to pain, and found but 37 (14 per cent.) in which it was absent. However, after analyzing these cases and excluding all possible sources of error, at the same time bearing in mind the personal equation of the various patients and of the physicians who made the diagnoses, the author believes that this malposition produces pain only when the uterus is enlarged. If, on the other hand, the uterus is normal in size and its ligaments are of natural elasticity and the adnexa are healthy, no pain is experienced. There are cases, however, in which all of these conditions obtain, and yet there is severe suffering. So far as gross structural changes are concerned, this symptom is inexplicable. It is possible that there may be minute pathological alterations in the tissues or in the nerve supply of the generative organs.

Many operations have been devised for the permanent replacement of the uterus, and as several have given good results it is probable that they may be of equal worth. There is no doubt that none is applicable to every case of retroposition or prolapsus, and each operation should be studied with a view to its adaptation to the proper cases. G. Winter[3] prefers *ventrosuspension* to Alexander's operation for young women during the childbearing period, for while the latter is not dangerous, is easy of execution, and causes no dystocia in subsequent labor, there is no assurance against recurrence. For women beyond the childbearing period he prefers *vaginal fixation.* In all cases of retroflexion, except in old women with atrophic uteri, he considers it advisable to suspend or fix the uterus when perineorrhaphy is necessary. In Winter's cases of vaginal fixation he has had 76.3 per cent. of 38 cases permanently cured.

So far as American gynecologists are concerned, vaginal fixation has never been a popular operation, and it has long since largely been abandoned; therefore, we cannot approve of Winter's advice in these cases.

Reifferscheid[4] has studied the results in 241 cases of the *Alexander*

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[1] Archiv f. Gynäk., Bd. lxxii.

[2] Zent. f. Gynäk., 1904, Nr. 47.

[3] Sammlung. zwangl. Abh. a d. Geb. der Frauenheilk. u. Geburtsch., Bd. v. Heft 8.

[4] Archiv f. Gynäk., Bd. lxxii Heft 1.

operation, performed in the Bonn Gynecological Clinic, and has also carried out investigations upon 12 cadavers, to determine its value. As the result of his studies, he regards ventrosuspension as the most effective operation for the cure of a retroposition. The Alexander operation is the safer, and if the uterus is mobile it gives almost as good permanent results as ventrosuspension. He discards vaginal fixation.

On account of the difficulty of finding the round ligament outside of the external abdominal ring, Beuttner believes that it should be sought for at the inner ring or in the inguinal canal. Other operators do not agree with him, but admit that in exceptional cases the ligament may be so attenuated that it cannot readily be found, under which condition the pillars of the external ring must be divided and the ligaments picked up in the canal. While trouble has also been experienced by some operators in finding the external ring it is usually attributable to inexperience rather than to any inherent fault of the operation. Occasionally after the isolation of the ligaments they may rupture in the attempt to shorten them, but with proper care this accident should only exceptionally occur. In shortening the ligament the peritoneum is stripped back, but not opened; if, however, the ligament should break it will be necessary to open the peritoneal cavity and secure it farther back. After the Alexander operation the bladder does not have the same freedom in its upward distention, and therefore distends laterally. On account of the pressure on the uterus during vesical distention it is necessary to avoid this condition for some time after the Alexander operation. Before operation the patient is catheterized and a pessary is introduced which remains in place until she is about to be discharged from the hospital.

Nothing new is offered in his article concerning the technique of the operation. He takes especial care to separate the accompanying nerves, and believes it is just as well to complete the operation on one side as to expose both ligaments at the same time. His results are given in tabular form:

Number of cases	241
Deaths (from pulmonary embolism after infected posterior colporrhaphy operation)	1
Healing of incision by granulation (Seventeen occurred in the first 107 cases, when the technique was not perfected. In the last 134 cases this complication occurred in but 1 case.)	18
Difficulty in finding the ligaments, one or both	18
Rupture of ligament, one or both	14
Good position of uterus at time of discharge from hospital	235
Position of uterus same as before operation	6
Percentage of recurrences in 90 cases examined by the author two months to five years (most of them six months to two years) after operation	5.5 per cent.

In 39 patients pregnancy occurred after the operation. Four abortions occurred; 22 had been delivered, and 13 were pregnant at the time of the author's paper. The labors were uneventful in all but 4 cases; 2 requiring postural treatment and 2 instrumental delivery.

The author also reports 61 Alexander operations in conjunction with operations with prolapsus uteri. In only 2 of the latter which were afterward examined was there any recurrence. As a result of his experience he believes this operation to be the least dangerous and the easiest for uncomplicated cases. In cases of simple retroposition, especially in the better classes of patients, he employs the pessary; but among the working classes, where time and money must needs be husbanded and where immediate results are requisite, he at once resorts to operation.

Steidle[1] reports 60 Alexander operations from the University clinic in Strassburg, of which 49 were afterward examined at periods of from two months to two and a half years, with 4.4 per cent. of recurrences. The indications for operation closely coincide with those of Riefferschneid.

Spaeth[2] objects to ventrofixation because it draws the uterus into the abdomen, while normally it is a pelvic organ. Furthermore, Kreutzmann, Gradenwitz, Michel, and others have shown the dangers following this operation from obstruction of the bowel. Spaeth prefers the Alexander operation in cases of mobile retroflexion; while in adherent cases or those complicated by adnexal disease he performs a vaginal section and fixes the uterus by vaginal or vesical attachment. There are many cases, however, in which dense adhesions associated with tumors, wide adhesions to the bowel, and absolute effacement of Douglas' pouch make an abdominal operation imperative. Under these circumstances he makes Pfannenstiel's suprapubic transverse incision, and after treating the adnexal disease and the adhesions of the uterus he grasps the round ligaments close to the internal ring, thrusts them through the ring, and then through the fascia of the abdominal wall at the extremities of the transverse incision. The peritoneum is stripped off from the ligament and the uterus is drawn forward in full sight to a proper anteposition, when the ligaments may be sutured in their new position with buried silkworm-gut or silk. The internal ring should be closed by suturing.

Sonnenfeld[3] is a firm believer in vaginal fixation or suspension of the uterus. He has reviewed 274 cases of retroposition operated upon at Orthmann's clinic in Berlin, upon whom several different operations were performed. They were as follows:

Vaginal fixation	210
Alexander's operation	26
Ventral fixation	38

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[1] Monat. f. Geburt. u. Gynäk., Bd. xix. Heft 2

[2] Zent. f. Gynäk., 1904, Nr. 17.

[3] Monat. f. Geburt. u. Gynäk., Bd. xix. Heft 4

The vaginal fixation comprised 165 intraperitoneal vaginal suspensions, 16 extraperitoneal suspensions, and 29 fixations of the round ligaments. The comparative results are best shown in the following table:

PREGNANCY FOLLOWING OPERATION.

Variety of operation and number of cases.	Tubal pregnancy.	Abortion.	Pregnant at time of report.	Labors.		Died.	Recurrence.	Permanent cure.	Unknown.
				Spontaneous.	Instrumental.				
Vaginal fixation :									
1. Intraperitoneal . . . . 165 cases.	1	2	...	3	...	1	2	84	78
2. Extraperitoneal . . . 16 cases.	...	...	...	3	...	...	...	11	5
3. Round ligament . . . 29 cases.	...	...	1	...	...	...	...	18	11
Alexander's operation . . . 26 cases.	...	1	1	2	1	...	3	11	12
Ventral fixation . . . . . 38 cases.	...	...	...	1	1	4	1	20	13
Total . . . 274 cases	1	3	2	9	2	5	6	144	119

The technique of intraperitoneal vaginofixation as employed by Sonnenfeld[1] is as follows:

A longitudinal incision is made in the median line of the anterior vaginal wall. The vaginal wall is stripped up on each side of this incision. About 1 cm. below the vesical border a transverse incision is made down to the cervix; the bladder is then pushed off from the cervix by blunt dissection, and, after finding the uterovesical fold of peritoneum, it is fixed with artery forceps and divided in a longitudinal direction, the anterior extremity of the peritoneal incision being fastened to the anterior extremity of the vaginal incision by a provisional suture. The anterior face of the uterus is caught as high up as possible and brought through the incision. Three sutures are passed into the uterine wall, the lowermost on a level with the uterovesical plicæ, and each of the two remaining about 0.5 cm. above the last, so that the highest is at a point somewhat under the middle of the fundus or 1.5 to 2 cm. above the level of the uterovesical fold. The ends of these sutures are carried through the border of the peritoneal and vaginal incision on their respective sides and tied. The remainder of the incision is closed from below upward with a running suture. The patient is allowed to leave the clinic on the seventeenth day. In this operation it is of course possible to break up posterior adhesions before placing the sutures. The author does not like Alexander's operation because it is only applicable to mobile cases, and because when colporrhaphy operations are required additional incisions must be made outside of the vagina, whereas if vaginal fixation is used this is not required. The difficulty in finding the ligament, its liability to rupture, and the author's high percentages of recurrence after the Alexander operation have led him to abandon it. He reserves ventral fixation for bad cases of adherent retroposition, and those in which adnexal disease is present.

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[1] Monat. f. Geburt. u. Gynäk., Bd. xix. Heft 4

Garrigues[1] in a recent article upon vaginal fixation says:

1. Vaginal fixation is a comparatively safe operation; in 120 cases there was no fatality and no injury occurred to the bladder.

2. The results of the operation are lasting; thus, of 78 extraperitoneal cases, 16 were afterward examined at a more or less remote period, varying from three months to two and a half years, and three times the uterus was found in the pelvic axis and twice in retroposition; in all of the others the uterus was in good position. Of 42 intraperitoneal cases, 9 were examined from three months to two years afterward, and there was but one recurrence.

3. There is no external scar from this operation.

4. The ovaries and tubes are accessible to operation if found diseased.

5. Plastic operation required at the same time may readily be performed.

6. Subsequent gestation is not complicated if the method is well chosen. Of 120 cases 12 became pregnant; of these 2 aborted. One, however, later bore a child normally. The rest had uneventful labors.

Garrigues makes a long incision from a point 1.5 cm. back of the meatus to a point below the posterior border of the bladder, as determined by a metal catheter. Silkworm-gut sutures are employed, and the first is introduced near the anterior end of the vaginal incision, passing through the peritoneum into the fundus of the uterus and back, the bladder in the mean while being retracted. A second suture is similarly passed. The peritoneum is closed with running catgut and the vaginal incision with silkworm-gut sutures. The sutures are left in place for seven weeks, the patient going home in the mean time. Silk is never to be used, as it carries infection.

Guérard[2] believes that the disturbances in labor following ventral or vaginal fixation are due to faulty technique in performing the operation. He has adopted the American methods of ventral suspension. The object of the operation, he says, is the same as that of a well-fitted pessary—viz., that it shall suspend the uterus only until raw surfaces made by the release of adhesions at the time of operation are healed, and until the true ligaments of the uterus have regained their tone. The author reports 57 cases of labor following ventrosuspension and 41 cases following vaginosuspension. In 4 cases after ventral suspension labor occurred twice. In 49 of these cases the suspension was performed in association with other pelvic operations. In this series there were 51 easy labors; in 2 the retroposition of the uterus recurred; in 5 forceps were required. Of the 41 births following vaginal fixation, which occurred in 39 cases, all were uneventful but 4, in which the application of forceps at the pelvic outlet was necessary. As to the frequency of abortion following these operations, he has noted 7 instances after ventral and 4 after vaginal suspensions.

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[1] International Journal of Surgery, New York, November, 1904.

[2] Monat. f. Geburt. u. Gynäk., Bd. xix

Kiriac[1] emphasizes the fact that the suspension operations for prolapsus may all fail. He recommends suturing the fundus to the parietal peritoneum after freshening the opposing surfaces until they bleed. After fixing the uterus the bladder is also sutured to the fundus. He styles this operation "hysterocystoventropexie."

Bardescu,[2] in the typical German fashion of ignoring American work, reports a new operation for retrodisplacement through the fixation of the round ligament in the fascia of the abdominal wall. It resembles the operation of Noble, of Atlanta, reported in last year's PROGRESSIVE MEDICINE, and is more or less like the operation described by Gilliam, Montgomery, and others.

Kocher[3] advises an operative procedure for inveterate cases of uterine prolapse as utterly devoid of surgical sense as is possible to conceive. He styles this operation "exohysteropexy." The technique of exohysteropexy is as follows: a median abdominal incision is made, through which the uterus is pushed until it is almost outside the abdominal cavity. It is fixed in this extraperitoneal position by closing the peritoneal incision above and below it and attaching the peritoneum to the sides of the uterus. The ovaries are left inside the peritoneal cavity. The fascia is either sewn over the uterus, or it may be attached to the uterus so it will lie directly under the skin. Care should be exercised not to fasten the uterus too near the symphysis pubis, as it may interfere with the function of the bladder. After this operation menstruation is normal. If pregnancy should occur, Kocher advises the release of the uterus so that it will slip back into its former position. Of the operations yet invented this appears to be the most unsurgical of them all, and we can see no justification whatever for its employment. It is only mentioned to be unreservedly condemned.

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[1] Referate: Zent. f. Gynäk., 1904, Nr. 4

[2] Zent. f. Gynäk., 1904, Nr. 3.

[3] Deutsch. med. Wochenschrift, Bd xxx, No. 15.

Wiggin[1] puckers up the broad ligament on each side of the uterus by a suture, which starts at the cornu of the uterus and is carried in purse-string fashion to the pelvic wall and back. These sutures on being tied shorten the broad ligaments on either side and afford a new point of attachment for the uterus at the pelvic brim.

Menge[2] reports a method of suspension of the uterus which he has used for three years. The operation consists in shortening the round ligaments on each side and then attaching them to the anterior surface of the uterus. The technique of the operation may be described as follows: A point is selected on each round ligament about a third of the distance from the cornus uteri to the internal abdominal ring. This is secured with catch forceps and drawn toward the median line, making a V of the uterine two-thirds of the ligament. The limbs of the V are now approximated with running catgut. The reduplicated ligament on each side is then drawn over the anterior surface of the uterus just below the fundus until the point of the obliterated V in the ligament meets its fellow on the opposite side in the middle line of the uterus. A running catgut suture unites the reduplicated ligaments to the uterine fundus in this position. The fold of broad ligament thrown up on either side by displacing the round ligaments inward in this fashion is now united along its edge on either side to the uterus. Menge claims priority in this operation and makes a point of using nothing but catgut for his sutures. He is attacked by Kleinwachter,[3] who says that what is practically the same operation was described by Palmer Dudley[4] ten years ago. Dudley freshened the anterior surface of the uterus in the median line below the fundus and also the anterior surface of the broad ligament in the form of a small ovoid. These raw surfaces on either side were then approximated to the anterior surface of the uterus by means of catgut sutures. This Kleinwachter affirms is essentially the same as Menge's operation and catgut sutures are entirely employed.

Menge's operation or the operation described by Menge closely resembles a procedure which I have been using for the past two or three years. As carried out in my clinic the operation differs in several points from those described. In the first place the round ligaments are buried in shallow incisions made in the fundus of the uterus anteriorly, and at least one or two silk sutures on either side are used. I believe to be sure of permanent results from this operation the incisions into the fundus are necessary for a firm attachment of the ligament.

Limitations of Vaginal Section. As a result of the continuous discussion of the advantages and disadvantages of the abdominal and vaginal methods of operating for pelvic diseases, a point has been reached when perhaps we can more accurately define the limitations of each method. Coincident with the development of abdominal surgery during the last three years, unquestionably the preponderance of evidence has been in favor of the abdominal section.

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[1] Journal of the American Medical Association, vol. xliii. No. 23.

[2] Zent. f. Gynäk., 1904, Nr. 29.

[3] Ibid.

[4] American Journal of Obstetrics, 1895, p. 732.

Recently Webster has defined the limitations of vaginal section in a very clear and concise way, and I believe he has very fully expressed the best surgical opinion upon this subject. Outside of the very important question that through an abdominal incision one is able to very fully inspect and remove diseased structures directly under the eye, there is a very great advantage in being able to take into account other abdominal organs which may also be the seat of disease, or indeed may have given rise to the dominating symptoms.

In speaking of vaginal section Webster[1] says that "the idea which some operators set before them—of merely removing some pathological condition—is a very bad one, and is out of harmony with the trend of the best work of recent years." It is equally important to operate in such a manner that the after condition of the patient may be the best. To this end raw surfaces must be covered as far as possible, and various other niceties be carried out for the benefit of the organs or parts left behind. To do this the abdominal route must be chosen. Plastic operations on the appendages or suspension of them is difficult or impossible by the vaginal route. The vermiform appendix is involved in a considerable number of cases of pelvic inflammatory disease, and the man who adopts the vaginal route extensively in these cases will be certain to leave behind a certain number of diseased appendices; the accident, too, will happen occasionally of tearing the appendix or the bowel in the separation of adhesions. The opportunity to explore the abdominal cavity and determine the condition of the gall-bladder, kidneys, and other organs is one of the great advantages of abdominal section.

Statements concerning the diminished mortality in colpotomy are misleading, for it is impossible to establish a fair comparison between the two operations. Complicated cases are, beyond doubt, best handled by the abdominal method. Cases performed with equal ease for either route should have in the hands of an expert the same mortality. In virginal or nulliparous women the vaginal route deserves no place. The author gives the following conditions under which the vaginal route may be properly considered:

1. Myoma uteri; small myomata. Extirpation of the entire uterus by morcellement, when the diameter of the fibroid uterus is not more than five inches, there are no adhesions, and the vagina is roomy.

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[1] Wisconsin Medical Journal, May, 1904.

2. Malignant disease of the uterus. The author thinks it is still a question whether the abdominal operation justifies the claims of its advocates.

3. Retroposition of the uterus. This may be relieved by shortening the round ligaments or by vaginal fixation. However, in the majority of cases this condition when it requires opening of the peritoneum may best be handled through an abdominal incision.

4. Inversion of the uterus.

5. Intrapelvic adhesions. As said before, the abdominal route is distinctly preferable because raw areas may be covered.

6. Diseased ovaries. Small, movable, thin-walled, and non-adherent cysts may be removed in this way. Resection is possible. Large, malignant, multilocular, adherent, and intraligamentary cysts, and those with torsion of the pedicle are not suitable for the vaginal operation.

7. Tubal diseases. In any case with adhesions or in complicated cases the vaginal route is risky.

8. Pelvic abscess. Incision and drainage is often indicated whatever the source of the abscess, provided it is easily palpable through the posterior fornix.

9. Ectopic gestation. In the early weeks the pregnant tubes may be removed by a vaginal section. There is less risk of rupturing the tube by the abdominal route and less risk of hemorrhage. After the tube ruptures, in the presence of a pelvic hæmatocele, vaginal incision and gauze drainage may be very satisfactory. Occasionally the bleeding recurs, when it may be necessary to open the abdomen.

10. Extensive infection of the genitalia. In bad cases, where total extirpation is required, the abdominal operation is to be preferred for the treatment of adhesions and denuded areas.

11. In serious cases complicated by a visceral lesion—*e. g.*, of the heart, lungs, or kidneys—the vaginal route is supposed by some to diminish the risk of shock. By carefully preparing the patient, swiftness in operation, and more local anæsthesia, the surgeon will have as good results by the abdominal as by the vaginal route.

12. Exploration. Vaginal incision for digital exploration of the pelvis is very limited in its scope. There is always a possibility in vaginal section that abdominal section will be necessary to complete the operation.

There are several forms of incision for vaginal section. Anterior colpotomy is the one usually employed. Webster's anterior colpotomy incision is thus described by him: It consists first of "a circular incision around the cervix just below the attachment of the vaginal wall. This is joined by a mesial incision an inch and a half or more in length, dividing the anterior vaginal wall. The cervix being well pulled down, the wall of the vaginal vault is stripped upward until the anterior pouch is reached. The anterior vaginal wall is also stripped somewhat from the base of the bladder. The uterovesical pouch is then opened."

The author believes his method allows more downward dislocation of the uterus than the other forms and gives better access to the parts. Additional space may sometimes be gained by a transverse incision into the pouch of Douglas. It may be advisable occasionally to tie the uterine artery on one or both sides. Where there is difficulty in bringing down the uterus the base of the broad ligaments close to the cervix may be divided. At the completion of the operation the uterus is pushed back into the pelvis and the peritoneal and vaginal wall incisions are closed with catgut.

Posterior colpotomy is used only for breaking up adhesions posterior to the uterus and opening collections of fluids in Douglas' pouch.

If amputation of the cervix is to be performed it is left until the close of the colpotomy operation, after the peritoneum is closed. The margins of the vaginal flaps are sewed to the cervical canal after amputation of the lips. If the size of the uterus is a hindrance in colpotomy, the cervix may be amputated early, immediately after stripping off the vaginal wall.

When anterior colporrhaphy is required the redundant tissue is removed at the beginning of the operation in connection with the first incision.

Diagnostic Use of the Uterine Sound. Methods of diagnosis, which in the preantiseptic era were followed by the direst results, may now be used with comparative safety, provided all of the precautions which attend a carefully conducted operation are observed. The uterine sound which was so universally employed in making a diagnosis before these dangers were realized, unquestionably left in its train an untold number of pelvic inflammatory cases which otherwise would not have occurred had not the septic instrument been passed into the cavity of the uterus. As a result of this sequel there was a universal protest made against the employment of this instrument, except in the rarest instances; and while these objections may be, to some extent, modified under proper precautions at the present time, nevertheless it would be a very hazardous policy for any teacher to countenance the use of the uterine sound for routine use in making a diagnosis. The certainty with which one may make a diagnosis through a bimanual pelvic examination renders obsolete an instrument which was employed before the development of this diagnostic means. Certainly a uterine sound should never be passed in the old-fashioned way, by guiding it to the external os by the index finger, for the dangers of infectious matter being carried directly into the uterine cavity are very manifest.

The proper method of introducing a uterine sound is first to expose the cervix to view with a bivalve speculum. The external os should then be thoroughly disinfected with pledgets of cotton soaked in 1:1000 or 1:500 bichloride of mercury solution, after which the sound may be introduced without coming in contact with the speculum, and enters directly into the uterine cavity without touching the surrounding parts.

In the following article various indications are given for the use of this instrument. It is with reluctance that we review this article, for in the hands of inexperienced or careless persons the uterine sound should never be used, and unfortunately it is this very class of irresponsible people who employ it.

Brothers[1] gives the following as conditions under which it is justifiable to use the uterine sound. To determine:

1. The patency of the internal or external os. Constriction of the internal os, in his experience, is one of the most frequent causes of sterility and dysmenorrhœa, and can only positively be diagnosed by the passage of a sound. Occlusion of the external os with retention of menses he has also encountered.
2. Patency of uterine interior. After intrauterine vaporization and after too deep curettage, the endometrial cavity may become obliterated.
3. The relation of the uterus to a tumor.
4. The presence of an intrauterine polyp or submucous fibroid.
5. The size of an undeveloped or hyperinvoluted uterus.

If I were to criticise the above indications for the use of the uterine sound I would exclude in every case his third indication, namely, the determination of the relationship of a tumor to the uterus. If one is to depend at all upon his diagnostic skill in bimanual palpation, this manipulation would not be necessary. As to the fourth indication, the symptoms will usually be so pronounced if there is a polyp or submucous fibroid that the introduction of a sound, except just before a curettage is performed for the removal of this growth, would not be justifiable. Certainly in the routine office examination it would never be wise for one to introduce a sound merely to establish the diagnosis, for if the patient is having a malodorous or hemorrhagic discharge, it is always an indication for a much more thorough examination than is possible by means of this instrument. The patient under these circumstances should be at once referred to the hospital for a diagnostic curettage. As to the fifth indication, likewise, there is very little argument in favor of the use of a sound to determine the size of an undeveloped or hyperinvoluted uterus, for both conditions should be diagnosticated by bimanual examination.

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[1] The Post-Graduate, July, 1904.

The contraindications laid down by Brothers for the use of this instrument are as follows. It should not be passed—

1. During a menstrual period.

2. During an acute inflammatory attack of the uterus, ovaries, pelvic peritoneum, and connective tissues.

3. In cancer of the cervix or body of the uterus.

We are inclined to lay much more stress upon the use of the curette as a diagnostic instrument than upon the sound. The latter instrument of course should never be employed except under the most complete operative precautions. The examination of scrapings obtained at curettage offers one of the most valuable means of diagnosis. Curettage must never be used alone for this purpose in the presence of pelvic peritonitis, parametric abscess, pyosalpinx, ovarian abscess, or extra-uterine pregnancy.

Another valuable method of intrauterine exploration and one little used, although long known and described, is digital examination. This, if it can be carried out, is the most reliable and surest means of exploration. In this way the presence and degree of attachment of intrauterine tumors, such as submucous fibroids and polypi, may be determined, and also intramural fibroids, so small that the curette may fail to recognize them, may thus be detected. Winter says that carcinoma of the fundus can be recognized as easily as carcinoma of the cervix when one is able to feel infiltration or ulceration of the wall. The author quotes Winter as advising in cases of uterine hemorrhage, first, the use of a sound; if roughness is discovered by this instrument, curettage should be performed and the scrapings examined histologically. If these fail to reveal the true nature of the affection, then digital examination is advisable. Furthermore, digital exploration is called for when the clinical symptoms are strikingly in opposition to the microscopic findings, as when the microscope fails to confirm the suspicion of malignancy in repeated hemorrhages; also when the microscope shows a benign intrauterine condition and recurrent hemorrhages lead to the suspicion of polypi or submucous myoma. It has been stated very truly by Keating and Coe that "in the unimpregnated uterus or where the cavity of the womb has not been dilated by disease, there is not room for the end of the finger." At any rate, in many cases dilatation of the cervix will be a necessary preliminary to a digital exploration. The author thinks this method of examination is infinitely preferable to the immediate use of the curette in puerperal fever. By the finger alone retained placenta or blood clots can often be removed—by the indiscriminate use of the curette in such cases much harm can be done.

Dysmenorrhœa. There is no symptom which is more difficult to satisfactorily cure than dysmenorrhœa, for it is dependent upon so many causes, several of which cannot be reached by either medicine or surgical remedies. A simple dysmenorrhœa, due to stenosis of the cervix will, in the large majority of cases, be radically improved or permanently cured by a thorough dilatation of the cervix. But unfortunately this mechanical disability is productive of this symptom in only a small percentage of cases, and it is for this reason that a dilatation of the cervix, notwithstanding it may be ever so thoroughly performed, is so frequently disappointing. In that large class of cases in which the painful menstruation arises from defective development of the generative tract or from a thickened capsule of the ovary, little can be done other than to palliate the symptoms at the menstrual period. Unfortunately in many of these cases the pain is so severe that sooner or later the patient may be driven to take some powerful sedative to relieve the agony, and in not a few instances the formation of the morphine habit may be traced to this source.

Any operative measure, therefore, which offers a radical relief of this condition must be welcomed; at the same time any operative or mechanical measure must carry with it a minimum danger in the way of subsequent impairment of the health through possible infection. Because of these possible dangers we are, therefore, inclined to look somewhat askance at the suggestion for the relief of scanty menstruation, which has been suggested in the following article:

Carstens[1] speaks of the difficulty experienced in the treatment of scanty and painful menstruation. The inefficiency of medication and hygienic rules is common experience. This applies to those cases in which no gross lesion can be found to account for the symptoms. The author finds a cause for this symptom at puberty in the defective development of the uterus. With the increased tax upon the mental powers there is a correspondingly diminished nutritive supply to the pelvic organs. Another class is indicated by the following: a young woman of especial aptitude passes through her school life without the least trouble, takes exercise, and nature has no trouble at all in developing her pelvic organs. She goes on in that way for a time, does not marry, and becomes a teacher, or engages in some occupation requiring more or less sedentary habits. Dysmenorrhœa develops, and at length she presents the same set of symptoms as were observed in the other young woman at puberty. In the one case the trouble originates from a failure of the uterus to develop; in the other it results from an atrophy of an unused organ. In both cases what the uterus needs is muscular exercise, and this the author finds is best obtained by the use of the stem pessary. The uterus will attempt to expel the foreign body by contraction, and in this way the uterine muscle will be benefited. Such a pessary may be left in place for months or even years.

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[1] Journal of the American Medical Association, December 10, 1904.

Other conditions which are also cured or greatly benefited by the use of the stem pessary are recurring stenosis, flexions of the uterus, scanty menstruation in fleshy women, and amenorrhœa caused by any of the conditions already considered. Any sort of a stem pessary will do, but the hard-rubber Chapman pessary is the best. All pelvic diseases, ovarian or tubal, must be positively excluded before this method of treatment is tried.

Leukocytosis as a Diagnostic Factor in Gynecological Cases. Leukocytosis is seldom of diagnostic value in gynecological cases. Occasionally, however, after an operation, when the temperature is atypical and nothing can be found upon palpation to explain an abnormal temperature, a leukocyte count may be of the greatest value. Thus, within the last year, in my own experience, typhoid fever has been detected twice by a careful blood examination, when the absence of leukocytes played a prominent role in the differential diagnosis, outside of the positive Widal test. While I do not lay very much stress upon the leukocyte count in the anteoperative study of cases—for only rarely, indeed, will such a differential resort be necessary—yet in postoperative cases it may be recommended with the assurance that in a given number of obscure cases it will make possible a satisfactory differential diagnosis.

Pankow[1] has carried out very careful investigations to determine the significance of leukocytosis in gynecological cases. He has taken apparently every possible precaution against error. It is not necessary here to recite his technique. It is sufficient to note that he selected his technique and his manner of investigation so as to rule out, as far as possible, errors which might occur in leukocyte estimation because of the following:

1. The normal leukocytosis after exertion or during digestion.
2. The inaccurate result from a small number of cells counted in making the estimate.
3. The unequal diffusion of the leukocytes throughout the diluting fluid.
4. The unequal number of leukocytes in different drops of the same mixture.
5. The difference in the number of leukocytes in the blood of the lobes of the right and left ears, which were used alternately.
6. The difference in the number of leukocytes in the blood from day to day.

All of these sources of error were guarded against (for particulars, see original article), and Pankow's results may be summarized as follows:

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[1] Archiv f. Gynäk., Bd. lxxii., u. Berichte Gesells. f. Geburtshin Leipzig, Zent. f. Gynäk., 1904, No. 11.

A. Behavior of the white blood corpuscles in suppurative and non-suppurative affections of the adnexa and the peritoneum.

1. In all cases where repeated counts give a leukocytosis of over 10,000 and other causes for the increase can be excluded, the diagnosis of pus is justified.

2. In cases where the leukocytes are under 10,000 the diagnosis of suppuration cannot certainly be excluded, for either there may be a tuberculous infection or there may be pus which is so deeply encapsulated that there is no absorption from it, and consequently no chemical irritation is exercised upon the white blood cells.

3. There is no leukocytosis in pelvic hæmatoceles unless suppuration occurs.

4. Rupture of a pregnant tube is associated with leukocytosis, which may be regarded as a posthemorrhagic increase of the white blood cells.

5. Torsion of the pedicle of an ovarian cyst directly after it occurs results in leukocytosis. This is probably produced by peritoneal irritation.

6. Fulminating peritonitis occurs without leukocytosis. The reactionary power of the body is destroyed.

7. It may be said, especially for gynecological suppuration, that a leukocytosis is often of low degree (11 to 13,000), but even this shows more certainly the presence of pus than does the temperature curve.

The estimation of leukocytes in gynecological diseases is to be looked upon as a significant and differential diagnostic aid.

B. Behavior of the white blood corpuscles in carcinoma.

The blood was examined from 14 carcinoma patients; in 13 there was carcinoma of the uterus; in 1 there was carcinoma of the ovary. The case of ovarian carcinoma gave no leukocytosis. In 3 of the uterine cases there was leukocytosis, but in 1 of these there was also pyosalpinx. There was infiltration of the parametria 7 times; 6 times on both, once on a single side. Infiltration of the pelvic glands occurred in 6 cases; in 3 the glands were carcinomatous. There was suppuration of the growth in 7 of the cases; in 12 there was cachexia. There was no case of pyometra. Two cases of uterine carcinoma alone showed leukocytosis, but had neither infiltration of the parametrium, glandular involvement, nor had cachexia. From these facts the author says:

1. In most cases of carcinoma of the uterus there is no leukocytosis.

2. The behavior of the leukocytes is independent of the growth of the tumor.

3. Carcinomata give no leukocytosis, unless pyometra exists. (Dützmann.) This is probably because the necrotic masses can be easily shed and have before that been nearly shut off from the circulatory supply, so that there is small chance of absorption.

4. The estimation of leukocytes in carcinoma is of no value in judging the extensiveness of the lesion or in prognosis.

C. Behavior of the white blood corpuscles in myoma uteri.

1. There is no leukocytosis from myoma *per se.*

2. After excessive acute hemorrhage in these cases there may be a posthemorrhagic leukocytosis.

3. Continuous small hemorrhages do not produce leukocytosis.

D. Behavior of the white corpuscles after operation.

1. After minor operations, as evacuation of abscess cavities, there occurs from the first day on a decrease in the number of white blood cells, unless there is some retention of pus.

2. When a major operation is undertaken for the removal of an abscess, there is a great increase in the number of leukocytes. This reaches its highest point on the first postoperative day; if there is no disturbance in healing, the leukocytosis progressively and slowly diminishes.

3. Disturbances in healing and stitch abscess cause a new increase in the number of leukocytes.

4. After so-called aseptic operations, as after the removal of an aseptic hæmatocele or myomectomy, postoperative leukocytosis is observed in the same degree as after the removal of a pyosalpinx.

5. The postoperative leukocytosis is not to be looked upon as a posthemorrhagic change, because there is not enough loss of blood in the majority of cases. Neither does it result from the anæsthesia, as control experiments have shown. According to the author's views, it depends upon the unavoidable slight infection of the wound and the chemical irritation produced by the secretions of the wound.

Routine Appendicectomy as a Coincident Part of Other Abdominal Operations. We have recently discussed the propriety of the coincident removal of the appendix when the abdomen is opened for some other cause. This question is one which has been open to discussion, and while, so far as my own opinion is concerned, I am inclined to favor the removal of the appendix, nevertheless, it should not be laid down as a cardinal rule for all cases, but should be subject to the patient's opinion.

Peterson, who has already discussed this question, and has taken the position that it is proper to remove the appendix as a routine measure, sustains his argument by the pathological findings in his cases. In my own experience the pathological examination of appendices removed in a considerable series of cases bears out Peterson's observations.

In a recent article upon this subject,[1] I have made the following statement:

"The medical profession has long since ceased discussing the question of the removal of the appendix in acute appendicitis; but concerning the removal of the apparently normal appendix in the course of another abdominal operation there has, however, quite properly been considerable doubt. To accurately determine this question one must decide: first, whether the mortality from abdominal operations in which this plan has been pursued is greater than in the same class of operations without appendicectomy; and second, what proportion of these presumably normal appendices has shown actual evidences of disease when subjected to histological examination. However, before taking up these points, the median incision as a route through which to reach the appendix may be considered. So far as my own experiences is concerned, the appendix may quite as easily be removed in the largest majority of cases through the central as through the incision directly over this organ. When the symptoms are unquestionably those of acute appendicitis, epecially where drainage may be a necessity, it is undoubtedly wiser to make the incision at McBurney's point, but as my paper deals solely with the associated operations, it is only necessary to consider the approach to the appendix for purposes of inspection and removal through the median incision.

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[1] Unsettled Questions in Abdominal Surgery, American Journal of Obstetrics, 1904, No. 5, vol. xlix.

"Either one of two plans may be instituted for quickly locating the appendix; the first of these is by touch. The acute angle of the ileum at its junction with the cæcum is usually the best guide when the attempt to locate the appendix by touch is made. With the finger hooked beneath the cæcum it is swept around this organ to the ileum, which is lightly grasped, and thus the cæcum may be drawn up into the wound, which at once brings into view the anterior longitudinal band, and this unerringly guides one to the appendix if it is followed persistently downward. When the cæcum is anchored by adhesions, this manœuvre may not be successful, and then the abdominal incision is lightly lifted upward with the retractor, when the cæcum may be located by sight, and with blunt forceps gently draw forward into the wound. In all abdominal cases, when the patient is intelligent, I am guided by her decision relative to the removal of the appendix. To this class of cases I usually state my personal position, namely, that if I were to have a cœliotomy performed for some other condition, I would instruct my surgeon to remove the appendix, but to free myself from exercising any undue influence, I further state that the dangers of the operation are slightly increased by this extra operation.

"According to this rule, in 120 cœliotomy cases in the University Hospital, in which some other disease formed the primary basis for operation, the appendix was removed. Pathological examination of these cases shows the following:

Normal appendices	25
Periappendicitis	39
Appendicitis, catarrhal (15 mild, 3 chronic)	18
" chronic (4 mild)	13
" obliterative	8
" acute	4
Hyperplasia of lymphoid elements in appendix	2
Appendicitis, mild acute	3
Fecal concretions in appendix	5
Appendicitis, interstitial	1
Carcinoma of appendix, primary	1
Pressure atrophy of the appendicular mucosa due to kink	1
Constriction due to previous catarrhal disease	1

"Thus it will be seen that while the largest proportion of these appendices were looked upon at the time of the operation as essentially normal, there were nevertheless a large number which were either inherently diseased or were inflamed as the result of association with inflammatory lesions in the pelvis. Thus 39 cases of periappendicitis were noted, 4 of acute appendicitis, and 1 very rare condition, a very early primary cancer of the appendix. In the latter case the patient was operated upon one year ago, and as yet there has been no evidence of a recurrence of the cancer. From this table it would appear, therefore, that the routine removal of the appendix as a coincident part of another abdominal operation is based upon a very appreciable pathological basis. If we were to make a comparative prognosis in these 120 cases with and without the removal of the appendix, there can be no question but that the ultimate mortality, and especially the morbidity in the same cases with the appendix left, would be very much greater than those without it.

"In this series of 120 cases only 1 patient died, and this death came from causes in no way attributable to the operation upon the appendix. Therefore, so far as the direct influence of the appendicular operation upon the recovery of the patient is concerned, it may be said not to have produced one single death. If, on the other hand, these cases were to have been discharged from the hospital without this additional operation, one dare not say that any such future possibilities for perfect health could exist; for there were 39 cases of periappendicitis, some of which would have inevitably produced more or less disability. There were 18 cases of catarrhal and 13 cases of chronic appendicitis, some of which would, sooner or later, certainly have become suppurative. Four were acute, which doubtless would have given rise to serious symptoms or even death of the patient during the immediate convalescence from pelvic operation. While the case of primary carcinoma of the appendix was an accidental discovery, and as it would not probably occur again in 1000 cases, it should hardly be considered a statistical possibility; nevertheless, this patient's life was saved by the removal of this organ.

"If, therefore, I had been in doubt before as to my personal rule concerning the removal of the appendix as an associated operation when the abdomen is opened for other causes, I would unqualifiedly declare in its favor, and would sustain this declaration by the foregoing pathological data."

Reuben Peterson,[1] who first advised the uniform removal of the appendix as a coincident part of another operation, believes, unless there is a distinct contraindication, that a thorough examination of all the abdominal organs should be made when the abdomen is opened. There is scarcely any contraindication to an examination of the vermiform appendix, and no surgeon will deny that this organ should be removed if diseased, provided this additional operation does not jeopardize the patient's life.

Peterson draws attention, however, to the difficulty experienced at times in deciding macroscopically whether a given appendix is diseased or not. The significance of the size and shape of the appendix, as well as the presence or absence of adhesions, constrictions, fecal concretions, etc., are yet not well understood. For the purpose of studying this question, Peterson has carefully observed 200 cases of appendicectomy in conjunction with some other intra-abdominal gynecological operations. No case is included in which the symptoms pointed primarily to the appendix. The organs were examined carefully in each instance and then compared with the findings upon histological examination in the laboratory. To show the carefulness with which the histological diagnosis was made in each case, it is only necessary to state that in all cases in which the appendix did not appear classically normal and yet did not show conclusive evidence of inflammation, it was classed with the appendices of doubtful significance.

The histological classification and the number of cases in each may be shown in the following table:

	Cases.	Per cent.
Negative	65	32.5
Chronic inflammation	57	28.5
Doubtful significance	41	20.5
Former inflammation	28	14.0
Acute inflammation	6	3.0
Periappendicular inflammation	3	1.5
	200	

It will be seen from this that 94, or 47 per cent., of the appendices showed a histological lesion. Comparing the gross findings with the histological, we see that the appendix was adherent in 18.5 per cent. of cases, and that adhesions were twice as frequent in those cases proved by the microscope to be the seat of past or present disease, as in those cases where the appendices were found to be normal. However, in 6.1 per cent. of the normal appendices adhesions were present. The shape of the appendix was abnormal in 26 per cent. of the cases. Comparing this abnormality of shape with the histological diagnosis, it is found that the mere shape of the organ serves as no index of its histological structure; thus, out of the 52 cases in which the appendix was noted as being club-shaped or bent upon itself, in 27 instances there was no disease of the organ; in the remaining 25 there were various degrees of inflammation. Fecal concretions were noted in 8 per cent. of the cases (this means palpable microscopic concretions); 8 of these cases appeared normal histologically, and 4 showed inflammatory changes.

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[1] American Journal of Obstetrics, July, 1904.

The author quotes further the association, as he has found it in his series, between the various forms of uterine and adnexal disease and inflammation of the vermiform appendix. The conclusions which he reaches are in part as follows:

1. A little more than 50 per cent. of appendices removed during the course of operation for pelvic disease will be found microscopically to be normal.

2. The remainder will show forms of acute or chronic inflammation as the result of former inflammation.

3. Menstrual pain may be due to or enhanced by the presence of an inflamed appendix. The congestion incident to menstruation increases the inflammation and gives rise to attacks of appendicular colic.

4. The appendix is adherent twice as frequently in those cases where microscopic examination shows past or present disease. A certain proportion of adherent appendices are, however, perfectly normal microscopically.

5. Mere shape of the appendix cannot serve as an index of its normality or disease. Appendices may be club-shaped, constricted, or bent upon themselves, and yet be perfectly normal microscopically.

6. The appendix is the seat of fecal concretions in at least 8 per cent. of all cases. Their existence does not denote that the appendix is diseased. The removal of an appendix, however, containing one or more such concretions is justifiable on the ground that their presence is a source of danger in predisposing to disease.

7. Nearly 50 per cent. of patients with chronic disease of the appendages show accompanying disease of the appendix.

8. Systematic examination of a series of removed appendices shows the occasional presence of primary carcinoma in such an early stage that it could not have been determined by inspection at the time of operation.

9. It is impossible to say by gross appearance alone whether the appendix is diseased, and, since nearly 50 per cent. of appendices in cases of

laparotomy for pelvic disease are the seat of pathological lesions, the surgeon's duty is to remove the appendix in every case, if there are no contraindications. Otherwise he will leave behind diseased appendices which may prove a subsequent source of suffering to the patient.

The Dangers of Pelvic Examinations. A timely warning has been offered by Kelly against the rough examination of patients. In many instances, frequently even with experienced physicians, the very roughest manipulation will be instituted in making a pelvic examination; and when one takes into account not only the dangers which may arise from traumatism but more especially the actual discomfort which is suffered, it is surprising that more accidents do not occur than are reported. The most skilful diagnostician will not use extreme force in making an examination, for he will detect infinitely more by a gentle than by a heavy touch. In a rough examination the pain experienced by the patient will probably defeat any possibility of making a satisfactory diagnosis, and quite naturally under these conditions the greater the pressure the greater the dangers to the patient. A cardinal point, therefore, which should be insisted upon by every teacher in gynecology, is the necessity for developing gentleness in the examination. On the same principle that the blind man will read the finest elevated print by merely lightly passing his finger tips over the elevation and will probably fail if heavy pressure is made upon the print, so the same will occur in any diagnosis where the sense of touch is involved.

In the following article Kelly[1] reminds us that the dangers which patients experience are not alone those incident to the modern aggressive operation. The preliminary gynecological examination itself may be dangerous. An injury brought about by this means may be the result of a too vigorous examination or the result of abnormal delicateness of the structures involved in the palpation. As a consequence of one or both of these factors it is not infrequent to rupture a thin-walled Graafian follicle cyst of the ovary. Other cystic collections may be ruptured which are of a more serious nature; thus, a papillomatous cyst, a cystic sarcoma, an extrauterine pregnancy, a pyosalpinx—any and all of these have been ruptured during examination, with more or less serious results.

It is rare to find an injury to the abdominal or vaginal wall as a result of the examination, although the tissues of the abdominal wall have been bruised during an examination. Kelly has never seen anything like a distinct hæmatoma or abscess produced in this way. The tough musculomembranous wall of the vagina shows little effect from the pressure of an examination. The most delicate of the structures lying between the palpating hand and the intrapelvic disease is the rectum with its musculomucosa. Kelly reports 4 cases in his own service in which the examining finger was actually thrust through the rectal coats into Douglas' cul-de-sac. The accidents either happened in his own hands (1 case) or in the hands of careful and competent assistants (3 cases). The cause of the injury lies in the age of the patients (in 3 averaging fifty-seven years) and the weakened muscular tone of the bowel. In one it is significantly noted that the patient was very stout. Hence, it is quite possible that especial effort had to be made to reach the pelvic structures and that the tissues were more friable.

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[1] Journal of the American Medical Association, November 26, 1904.

As a safeguard against the accident Kelly would recommend the utmost gentleness in rectal palpation, especially in stout, elderly women. It is a good plan, he says, to empty the bowel before examination, place the woman in the knee-chest position, and distend the rectum with air. Upon returning the patient to the dorsal posture it will be found that the rectum by this distention has applied itself to the pelvic structures. The examiner should carefully avoid invagination of the ampulla, thus pushing it up to a higher point than normal; he should pass the finger beyond the rectal valves, behind the cervix, the so-called "third sphincter," and then up into the pelvis. The rectum at this point lies normally in contact with the posterior surface of the uterus and the left broad ligament. In case a perforation of the rectum occurs, it is proper to immediately open Douglas' cul-de-sac and suture the bowel from the peritoneal side. Drainage through the posterior vaginal incision should then be instituted. If the perineum and vagina are rigid and contracted, or if for any reason the rent is difficult to expose by this route, or if the abdomen is about to be opened for another purpose, it should be repaired through the superior strait. In either event drainage should be established through the vagina.

It is of great importance that the sutures are well placed, passing through the serous, muscular, and subserous coats as far as the mucosa, and that they secure accurate apposition. After such an operation the patient should be kept on albumen-water for five to seven days. The anal orifice should be thoroughly dilated and a rectal tube kept in place, in order to carry off gases and keep the parts at rest.

Tuberculosis of the Urinary Track in Women. Up to the time of the invention of the various forms of the cystoscope, very little had been done in the diagnosis and treatment of tuberculosis of the genitourinary track. While this invention has not solely been responsible for the improvement in diagnosis and operative treatment of these cases, nevertheless it has greatly stimulated their careful study. As will be pointed out in the following article, it is possible to make a diagnosis of tuberculosis of the kidney without the use of the cystoscope; but one must not depend solely upon symptoms in reaching this end, for the various clinical methods of scientific precision must be employed, if the case is to have the most thorough study. While the bacteriological study of the urine in tuberculosis of the genitourinary track is oftentimes negative, if, as pointed out by Hunner, daily examinatons of the urine are made, sooner or later the bacilli will be found.

In the following critical summary the various clinical points bearing upon tuberculosis of the genitourinary tract have been so clearly brought out as to require little or no comment.

The subject has been very thoroughly studied by Hunner[1] in his review of 35 cases of tuberculosis of the urinary system in women. From his study he finds that this is a disease of young adults; 20 of the 35 cases were only thirty years old or younger. The average age at the time of treatment was thirty-two and a half years.

A family history was obtained from 28 of the cases, and in 13 there was a history of tuberculosis. Hunner draws attention to the ease with which significant facts may be overlooked in the inquiry concerning a tuberculous family history. The patient may not know of any tuberculous tendencies, yet careful questioning may elicit information that points directly to diseases which may have been of a tuberculous nature.

In four cases there had been previous illnesses which were probably tuberculous in nature. Furthermore, there were five cases in which there was a history of a previous disease which may have left the kidneys a "locus minoris resistentiæ." In 2 of 5 cases of scarlet fever there appears to have been a definite association between the two infections. The past history may also be interesting in that it serves to show that sometimes the patient has been treated for the tuberculous lesion of the kidney under a mistaken diagnosis. Thus one case had been treated for nine years for a supposed malaria; chills and fever were her most pronounced symptoms. In another case the right kidney had been suspended six months prior to left nephrectomy for supposed Dietl's crises. Other patients had been treated for appendicitis, rheumatism, and la grippe. Hunner himself mistook one of the reported cases, two years before a correct diagnosis was made, for a floating kidney.

In the clinical history the duration of the disease and the probable seat of origin in the urinary system are especially to be noted. The extremes of existence of the symptoms were two months and seventeen years. The original seat of the lesion appears most often to have been in the kidneys, even though the first symptoms were referable to the bladder (as they were in 17 out of the 35 cases). A close scrutiny of the histories and comparison with the clinical and pathological findings has convinced Hunner that in by far the great majority of cases urinary tuberculosis in women originates in the kidneys. Making the widest allowance for its possibility the author has classed but 5 of his 35 cases as primarily located in the bladder.

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[1] Johns Hopkins Hospital Bulletin, January, 1904.

The general condition of the patient varied considerably; while some of them presented the picture of health, others appeared almost moribund. Although the care the patient has received, her hygienic surroundings, freedom from care, etc., influence her general condition to a degree, those patients are most effected in whom the kidney does not drain freely all the time (attacks of pain, chills and fever periodically), or in whom there is such irritability of the bladder at night that the patient gets but little rest.

The physical examination is also of interest with regard to the question of tuberculosis elsewhere in the economy. In 9 of the cases tuberculosis probably existed in other parts.

Although cystoscopic examination is of the greatest use in the diagnosis and treatment of this disease, the physician is not excused from making a diagnosis without this assistance. A careful history alone is of great service. Pain in the back, side, or inguinal region, together with a disturbance of the bladder functions, leads one to suspect some kidney disease. The kidney is usually palpable and tender. Palpation over the course of the ureter as it crosses the brim of the pelvis often elicits tenderness and a desire to urinate; or the thickened ureter may be felt in this region. By vaginal palpation thickening of the bladder or of the ureter may be determined. By rectal examination the ureter can be followed well out toward the pelvic wall. Although these local conditions may be caused by other infections than tuberculosis, the latter is their most common cause. The tuberculin test may afford further help in establishing a diagnosis. The signs of tuberculosis in other organs weigh heavily in favor of tuberculosis here. Examination of the urine is the only positive means of making a diagnosis. The author holds that tubercle bacilli should be found in the urine in practically every case of kidney tuberculosis. The best means for their detection is not, as some have urged, by the examination of 20 to 30 slides a day. Better than this is the examination of 1 or 2 slides daily and in the course of a week there is likely to be a shower of bacilli, marking the recent breaking down of a focus of the disease.

It should be borne in mind that sometimes when the patient feels the worst (pain, chills, fever) the urine may be perfectly clear (blocked ureter). A differential stain to exclude the smegma bacillus should always be used. When the tubercle bacilli are not found in this manner a guinea-pig should be injected. In the series of cases reported, tubercle bacilli were found in 15 out of 22 cases in which the examination was made. It remains to be said that the cystoscope is, in the hands of those accustomed to its use, a valuable instrument in determining the condition of the kidneys, ureters, and bladder, and in deciding what should be done, and in what order.

Hunner strongly protests against catheterization of supposedly healthy kidneys through a bladder known to be infected. Catheterization of the supposedly healthy side is not necessary. The end of the speculum held under this ureteral orifice will in a few minutes collect enough urine for a satisfactory examination; or the diseased side may be catheterized and the bladder washed out, allowing the urine which then collects there to represent the healthy side. "One becomes accustomed," says Hunner, "to make due allowance for the few pus cells and epithelial cells that may have been left in the bladder after the washing, or that may come from the bladder ulcers during manipulation."

TREATMENT. This was surgical in all of Hunner's series. He is very skeptical concerning the topical treatment of vesical tuberculosis, for he has yet to see a case recover without the use of the knife. He has had in the last six months some experience with Caspar's method of treatment (small bi-weekly instillations of mercuric bichloride, 1:10,000 to 1:1000) and is somewhat encouraged in the belief that it may be useful. The operations performed were as follows:

Simple nephrotomy	3
Nephrectomy	9
Nephrectomy and partial ureterectomy	7
Nephroureterectomy	13
Nephroureterocystectomy	3

The author is disinclined toward the latter operation because of the good results following nephroureterectomy, and because in the great majority of cases the bladder condition will clear up after removal of the primary cause. He recommends for the perfomance of this operation a double incision, one lumbar and one inguinal, with a preliminary resection of the twelfth rib. The resection simplifies very much the exposure and control of the bloodvessels.

Hunner finds from an analysis of his cases that tuberculosis of the ureter exists in a large proportion of cases of tuberculosis of the kidney; also that a wound may close rapidly after the partial removal of a tuberculous ureter or it may suppurate for years after the complete removal of a non-tuberculous ureter; but that in general the partial removal of a tuberculous ureter is followed by months or years of suppuration, while the complete removal results in rapid closure of the wound.

SUMMARY OF RESULTS.

Not heard from	1
Deaths	5
Tuberculous infection of other kidney	2
Bladder symptoms still persist (11 of these, however, are in good health.)	13
Entirely well	9
Recent cases, with colon bacillus infection of remaining kidney; feel very well	2

The author closes his paper with these conclusions:

1. Urinary tuberculosis in women is a disease of early adult life.

2. It is usually primary in the kidney, although about half of the patients complain first of bladder symptoms.

3. It is confined to one side in the vast majority of cases. If involving both sides, a very painstaking examination must be made of the separate urines to determine whether the treatment should be surgical or medical.

4. The disease should be kept in mind in dealing with any symptoms referable to the urinary tract; even such common occurrences as a supposed movable kidney or incontinence of urine should be carefully investigated.

5. Appendicitis and gallstone colic must be differentiated. Any obscure or atypical case of supposed malaria or typhoid fever should remind one of this disease.

6. The disease is compatible with a long life of comparative health, and macroscopic and microscopic examination of our specimens show that in some cases there is a tendency to spontaneous healing; but in spite of these two facts a careful study of these 35 cases shows the disease to be pre-eminently surgical.

Postoperative Cystitis. Among the extremely disagreeable and very painful sequels to gynecological operations is postoperative cystitis. As has been pointed out in PROGRESSIVE MEDICINE, this inflammation is not a general one as a rule, but is usually located at the trigonum. Although it may not be general, nevertheless the pain is quite as acute, and is very distressing to the patient. In some cases, notwithstanding the most careful precautions which may be observed in the technique of catheterization, this complication will arise. Any suggestion, therefore, as to its treatment will be welcome to every abdominal surgeon.

In the following article special stress has been laid upon the dangers of cystitis following hysterectomy for cancer. Sampson, of the Johns Hopkins Hospital, has also laid great stress upon this complication, and has recently advised the establishment of a vesicovaginal fistula in every case before a radical hysterectomy in order to avoid it. By this means he claims that patients are made comfortable and that subsequently the fistula may be closed without difficulty, and thus a complication which may even terminate the patient's life in addition to making her most miserable may be avoided.

Baisch[1] reports a case in which, following panhysterectomy for carcinoma, a patient died at the end of fourteen months from a progressive postoperative infection of the bladder. He thinks that some deaths are due to such a condition even when they are supposed to be the result of recurrence of cancer or intrauterine affection.

Since systematic rinsing of the bladder after each use of the catheter in Doderlein's clinic, in 31 cases of carcinoma operated upon by the Wertheim method, there has not been a single case of cystitis; this in view of the fact that some of the cases required regular catheterization for eighteen days after the operation.

Adrenalin in Internal Hemorrhage. From time to time during the last three or four years articles have appeared lauding the value of adrenalin in the control of internal hemorrhage. While as yet a positive judgment as to its value cannot be offered, nevertheless the evidence thus far does not bear out the rosy forecast made in its favor. In my own experience I have very systematically employed adrenalin or the extract of the suprarenal gland for the control of atypical uterine hemorrhages, not incident to structural but more to vascular changes such as are frequently noted in women about the time of the menopause. So far as my own experience is concerned, I have not as yet been convinced that this remedy works any very material benefit in these cases. In a few instances, however, of very profuse bleeding, which were not dependent upon any demonstrable pathological lesion, the direct injection of adrenalin solution into the uterine cavity has proved of signal value, controlling almost immediately the excessive flow. In one case especially, where a patient had been curetted three times by various operators without any benefit, and in whom no serious structural defects were discovered by my examination, the flow could almost immediately be checked by the injection with a Braun's uterine syringe of 1 drachm of a 1:4000 solution of adrenalin directly into the uterine cavity. After four or five periodical treatments the menorrhagia grew rapidly better, and finally gave the patient no further trouble.

In the following articles experiments have been instituted which prove that larger doses of adrenalin may be given than are usually recommended by text-books upon materia medica.

Simonovitch[2] found that dogs and rabbits tolerated large doses of the drug by the mouth without general effects. Human subjects also took five times the usually accepted largest therapeutic dose without showing any general effects, not even a single subjective symptom. No general effects were observed in the animals, even after the intestines had been intentionally injured. Absorption of adrenalin into the blood through the mucous membrane of the alimentary canal must, therefore, be a very slow process. The inference is obvious that it can be ingested with impunity and hence may be found extremely valuable in cases of internal hemorrhage. Its local action as an internal hæmostatic will be enhanced by giving it in small repeated doses rather than large single ones. The animals in his tests took 0.015 to 0.03 gm., and the human subjects five times the usual dose of 0.01 gm. He made comparative tests with potassium iodide, which passed into the urine in half an hour, while the adrenalin could not be detected in the blood. The general effects were realized only when the adrenalin was injected directly into a vein. This is allowable to revive the heart only in desperate cases as a last resort, owing to the danger of paralysis of the heart which occurred in a number of his experiments on animals.

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[1] Zent. f. Gynäk., 1904, Nr. 12; Abstract, Journal of the American Medical Association, April 30th, 1904.

[2] Russkii Vratch, 11, 24; Abstract, Journal of the American Medical Association, January 23, 1904.

Fenomenow[1] has found that adrenalin affects differently the various parts of the mucosa of the genitalia, the same as its action is different on the mucosa of the nose, throat, and larynx. It does not seem to affect the mucosa of the vagina, but has a pronounced action on that of the uterus. He even found that ischemia was marked throughout the entire uterine mucosa when the adrenalin was applied to the cervix alone. He was able to curette the uterus with a minimum loss of blood after merely tamponing the cervix with gauze impregnated with a 0.2:1000 solution of adrenalin. This difference in the response to adrenalin between the mucosa of the vagina and of the uterus could be noted in the same subject.

Appendiculo-ovarian Ligament. From the anatomical standpoint there have been two or three interesting articles within the last few years on the appendiculo-ovarian ligament. Clinical advantage may be taken of this close relationship in the differential diagnosis between a tubal inflammation and appendicitis. In inflammation of the tube, if the cervix is tugged upon, the patient will complain of pain low down in the pelvis, in the region of the ovary or tube, whereas if the appendix is acutely inflamed and this same diagnostic manœuvre is instituted, the patient usually experiences the greatest pain about McBurney's point.

In the following article Craig[2] has pointed out new possibilities concerning this ligament, for he claims that in some instances it is inflamed and gives rise to characteristic symptoms of pain and dragging, which are not explained by any irritation or inflammation of the appendix or of the tube or ovary. He has observed a series of 6 cases which directed his attention to the clinical importance of the so-called appendiculo-ovarian ligament. After mentioning the various titles under which this structure has been known, the author agrees with Nagel that it has no definite or constant relation to the appendix, and is simply the upper or suprapelvic portion of the infundibulo pelvic ligament, and exists on both sides of the pelvis. If this is correct then the lymphatic connection between the uterine appendages and the appendix is more or less accidental, and depends entirely on an anastomosis between the vessels of the appendix and the ovary. The author does not believe there is necessarily any clinical relation between the right uterine appendages and the appendix. He has observed 6 cases, clinically, in which this suprapelvic or extrapelvic part of the infundibulo pelvic ligament was thickened and tender, and in which there was relief of symptoms following the excision of a V-shaped piece. The cases had several points in common which, says Craig, may serve as diagnostic guides in the future.

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[1] Semaine Médicale, xxiii. 49; Abstract, Journal of the American Medical Association, January 9, 1904.

[2] Journal of the American Medical Association, November 12, 1904.

1. Tenderness starting high up in the right iliac region and extending continuously down to the true pelvis.
2. Sense of dragging in the iliac region.
3. More or less pronounced displacement of the uterus to the side of the affected ligament.

Although all of the author's cases were confined to the right side, he sees no reason why the left ligament also should not be affected. The fact that in all but one of his cases the appendix was normal and on being left in the abdomen has given rise to no symptoms, seems to negative the tentative opinion that the existence of the appendix on the right side makes that ligament more liable to irritation. In all six of the cases Craig believes the condition of the ligament was an important clinical factor, and in 3 cases it was apparently the only disease-producing factor.

The Ravages of Gonorrhœa in Women. As is well known, previous to Noeggerath's epoch-making paper, little or no stress was laid upon this disease as a serious factor in the ailments of women. In discussing the sterility of women it was not even alluded to. For the last two decades, however, its dangers have been more and more dwelt upon, until perhaps they have been exaggerated. Nevertheless, the fact remains, as pointed out by Bumm, that it is a tremendous factor in the permanent impairment of women's health. In the following articles the rather exaggerated dangers may perhaps be compared with the more conservative statements made by Bumm in his article on sterility in women.

Johnson[1] believes that there is no disease of modern times that has caused as much indirect mortality, mutilation, and suffering as gonorrhœa. He quotes Morrow, who says that while syphilis has a more devastating effect upon the product of conception, there is no disease which has such a dire effect upon the health and procreative activity of woman as gonorrhœa.

It has been stated by Sutton that gonorrhœa accounts mainly for the sterility of prostitutes. That the disease plays a large factor in race suicide cannot be questioned.

Although venereal diseases destroy more lives and deplete the population through abortion and the prevention of conception than any other diseases, the fact is largely ignored by civic authorities. The author says that it has been recently admitted that gonorrhœa is more widespread than any other disease. It has been estimated that from 75 to 90 per cent. of the male population of large cities have had gonorrhœa; 5 to 18 per cent. have had syphilis. In view of these facts it is remarkable that the prevalence of this disease has not been more taken into account in its relation to marriage. Noeggerath has stated that of every 1000 men married in New York, 800 have had gonorrhœa, and that a majority of these husbands infect their wives. Morrow found that 70 per cent. of the women coming to the New York Hospital during a period of seven years with gonorrhœa were respectable women and had been infected by their husbands. Janet speaks of gonorrhœa with tuberculosis as the great pests of our age.

Noeggerath in 1876 declared that 50 per cent. of female sterility was due to gonorrhœa. In a careful study of 81 women, the subjects of gonorrhœa, he found 49 sterile and the remaining 32 bore but 39 children. Neisser believes more than 45 per cent. of the cases of sterility in women are due to the gonococcus.

Lier-Ascher found 121 women out of 227 sterile because of Neisserian infection. Kehren studied 96 sterile marriages; 30 per cent. were accounted for by the absence of spermatozoa in the male; in 45 per cent gonorrhœa was the cause.

Gruenwald, Kammera, and Crolax report 53, 83, and 40 per cent. respectively. Williams insists that 73 per cent. of all abortions are due to gonorrhœal endometritis.

It is well known that conception and childbirth may occur in the presence of gonorrhœa of the cervix and vulva, and very often the recipients of the gonorrhœal infection bear one child and in this way prove their ability to procreate. Following labor, however, there is a progression upward of the disease, and the women are thereafter sterile.

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[1] Journal of the American Medical Association, March 11, 1905.

Such sterility is relative rather than absolute, and has been spoken of as "one-child sterility."

Gonorrhœa is a large factor in abortion. According to Savage it ranks with syphilis in this respect. Of 53 women with latent gonorrhœa, observed by Noeggerath, 19 aborted. Fruhensholz reported a series of 101 pregnancies in gonorrhœal women; 71 went to term; 23 aborted; and 7 were delivered prematurely. Another series of 201 pregnancies shows 161 completed, 36 prematurely delivered, and 4 aborted.

The Section on Hygiene and Sanitary Science of the American Medical Association in 1901 sent the following query to many of the leading gynecologists in this country and in Europe: "What is the proportion of cases of pelvic inflammation coming under your care which are attributable to gonorrhœal infection?"

The general average of the statistics given was 40 per cent. The mutilation, suffering, invalidism, and death caused by the ravages of pelvic inflammation need not be dwelt upon. It is too well known.

The author believes that the race suicide due to this disease, if it could be ascertained, would equal in number of lives lost from either pneumonia, tuberculosis, or typhoid fever, or maybe all of them combined.

When May the Gonorrhœic Man Marry? Findley,[1] after outlining the course of gonorrhœa and agreeing with Noeggerath in the main as to the frequency and incurability of gonorrhœa, asks whether physicians are ever, and if so, when, justified in endorsing a marriage when the prospective bridegroom has had gonorrhœa. In answering this query one must bear in mind the difficulty in curing gonorrhœa absolutely, and the fact that it may persist for years without any visible signs and then transmit a virulent infection to another. "Certainly, we can never say positively that a man once infected has rid himself entirely of the infection, and hence will not infect his wife." This uncertainty, together with the suffering and misery to which a woman may be brought by this disease, and the fact that 8 per cent. of all marriages are sterile because of gonorrhœa, make the physician pause in telling a patient once infected that he may safely marry. Fritsch has said that of every 100 women who have married gonorrhœal husbands, 90 are seriously incapacitated by some gonorrhœal ailment, and the author is inclined to think this statement true. The physician therefore would do well to hesitate under such circumstances. Findley himself says he would never sanction such a marriage.

Sterility in Women. In many cases it is almost impossible to determine the cause of sterility in women, therefore, the following article by Bumm will be of especial interest, for he has very fully considered the question of congenital and acquired sterility. In view of the fact that this writer was one of the pioneer investigators in the study of gonorrhœal infection in women, his opinion concerning this factor in the production of sterility is a very weighty one. In recent articles upon sterility, the major cause has been ascribed to this source. To the contrary, Bumm takes a very positive position that this condition arises more frequently from congenital defects than from so-called pathological changes. I have read his article with more than ordinary interest, for he has thrown light upon many cases which had hitherto been unexplainable.

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[1] Cincinnati Lancet-Clinic, January 16, 1904.

The minor defects in development, such as the long, taperoid cervix or its opposite, the flat, blunt cervix, are seldom taken into account in arriving at an explanation as to the cause of sterility in a given case. Bumm's suggestions for treatment are very logical, and, if carried out in the precise manner in which he has detailed them, should give effectual results. Certainly, from the report of his own experience in the treatment of these cases he has been unusually successful in overcoming sterility. By way of caution it may be said, however, that unless the methods of treatment which he suggests for correcting structural defects in development are very painstakingly carried out and executed, with the aseptic precautions incident to any surgical operation, they may be productive of very serious harm.

Relative to *gonorrhœa* as the cause of sterility Bumm[1] draws attention to the assertion that 80 to 90 per cent. of all cases of sterility in women are due to gonorrhœa. It is at once evident, he says, that this is an error from the fact that 15 to 20 per cent. of women in maternity hospitals suffer from chronic gonorrhœa which they had contracted before conception and in the presence of which they repeatedly conceive. According to Bumm, although gonorrhœa may play the greatest role in masculine sterility, it is otherwise in the opposite sex. Two-thirds of the cases of sterility in women depend upon faulty development, the other third comprising acquired sterility, in which gonorrhœa plays a large part. Defects in development of course render a woman sterile in the very beginning of her married life. Sterility from gonorrhœa is often secondary—occurring after abortion or labor, when the infection gains access to the uterine cavity and to the tubes. The developmental defect is not extensive, and only in rare instances consists of the entire absence of a part or of the whole of the genital tract. In the majority of cases it is more an arrest of development, a persistence of the infantile or fetal stage. This condition may be associated with a poor development of the secondary sexual characteristics, but it occurs too in those who have a normal external appearance; frequently it is found associated with a robust carriage and a large, masculine-like frame and pelvis. In isolated cases the arrest in development affects the entire genital tract. The vulva is small and is situated high upon the symphysis, the labia majora are badly developed, the vagina is short, the vaginal vault is undeveloped, the uterus is tiny and hangs in marked anteflexion or retroflexion; the tubes are greatly twisted, like the tubes before birth, the fimbriæ are badly formed, and the ovaries possess less than two-thirds their normal size.

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[1] Deutsch. med. Wochenschrift, Bd. xxx., Nr. 48.

All of these defects can occur alone and confined to their particular part; thus the ovaries and tubes can be defective while the other parts are normal, or the malformation can affect the vaginal vault and the cervix. For example, the vagina may pass directly into the cervical tissue without exhibiting either an anterior or a posterior fornix; the cervix may be either cone-shaped and elongated, or exceedingly small, being sharply kinked against the uterine body. The so-called pathological anteversion combined with dysmenorrhœa and sterility depends upon an incomplete development of the uterus.

How an infantile state of the genitalia in whole or in part prevents conception is not entirely explainable. The phenomena of normal impregnation and conception remain in their minute details more or less conjectural, and so must our understanding be of the point in question.

Given a case in which the ovaries are small, the menstrual periods occur at long intervals, and the flow is scant, it may be taken for granted that ovarian activity is defective and that ova capable of impregnation are extruded only at long intervals. It is easy to see how elongated, excessively twisted tubes interfere with the passage of ova and of spermatozoa. A badly developed uterine body and endometrium may prove a bar to the penetration of spermatic particles or to the embedment of fertilized ova. The disturbances which may be produced by a faulty development of the cervix or vaginal vault are more easily understood. It is important physiologically that the vaginal vault be of such shape that it will retain semen which is deposited there for some time. The author has observed repeatedly in cases in which there is a short anterior vaginal wall and a defective fornix that even a few hours after coition there will not be a single spermatic particle in the vagina or cervical canal. Although it requires but one spermatozoon to fertilize an ovum, the latter is more apt to be met and fertilized when at least a thousand of the millions of spermatic particles deposited at each emission gain access to the internal genitalia. The shape of the cervix, even though the vaginal vault be normal, may hinder the ingress of spermatic particles. The same is true of a narrow external or internal os, although it is hard to understand why this serves as an obstruction when the opening in the worst forms is always larger than the internal orifice of the Fallopian tube.

Alterations in the endometrium or cervical mucosa may hinder conception by either furnishing unfavorable or actually inimical conditions to spermatic ingress and life. What has already been said will indicate the infinite variety of functional shortcomings which may produce sterility. From this very fact there has been more or less haphazard treatment of these cases, with an occasional happy result. Patients have passed through the whole gamut of gynecological manœuvres from the laminaria tent to curettage and the use of a pessary. Bumm feels that every treatment should be preceded by a careful microscopic study, with a view to determine whether the spermatic particles gain entrance into the uterus; in doing this the danger of carrying gonorrhœa from the cervix to the uterine body and tubes should be carefully avoided. In the presence of an infantile uterus with perfectly developed adnexa, the author has been pleased with the results of galvanism. The positive electrode in the form of a large salt-water compress is placed upon the abdomen; the negative electrode in the form of a sterile sound is passed into the uterus. A weak current up to 50 milliamperes for five minutes is used. After this galvanization, given two to three times weekly, the uterus should be lightly massaged. After three months of such treatment the uterine body may enlarge 1.5 cm., menstruation may become entirely normal, and pregnancy may ensue. The author has treated in the past five years by this means twelve women for infantile development of the inner genitalia. Five of these women were relieved of dysmenorrhœa; two of these five were not married; three were married and subsequently conceived. In the remaining seven the menstrual suffering grew less, but conception did not occur and the uterine cavity did not increase in length. When the uterine body does not enlarge in spite of this treatment conception is out of the question, and any operation to correct a malflexion of the uterus is useless.

If the internal genitalia are normal and the difficulty lies in the passage of the seminal elements from the vaginal vault to the uterine cavity, a number of measures should be tried.

When the vaginal vault is poorly developed, regular persistent massage and the application of tampons may produce an improvement in the configuration of this part. Also the introduction of a small round or bell-shaped pessary may hinder the egress of deposited seminal fluid. In two women several years sterile this means has proved effectual.

The entrance of spermatozoa may be furthered by splitting the cervical lip posteriorly as far as the vaginal vault, or the vaginal cervix may be amputated. In either case entrance to the cervix will be facilitated. In the presence of stenosis of the internal os, the best results are obtained by gradual dilatation. The ordinary operation of dilatation is soon followed by recurrence. The author first uses Hegar's dilators up to No. 10. Then, after an interval of fourteen days, and always directly after the menstrual period, he substituted a special instrument which he has devised very much like Kallmann's urethral dilator, and slowly dilates the inner os up to 1 cm. In this way the stenosis is gradually relieved and the callous-like quality of the stricture is destroyed, the tissues becoming normally soft. Of seven sterile women more than three years married, in whom this dilatation was effected, four have conceived in the course of three to six months.

The prospect of curing sterility caused by gonorrhœa depends upon the stage of the disease. If the infection is confined to the mucosa of the urethra and the cervical canal, there is great probability that the disease can be made to run its course without further disturbance of function, and that sooner or later conception will occur. To this end it is of the highest importance to avoid any intrauterine manipulation and to prescribe rest shortly before, during, and after the menstrual periods. When the disease has become chronic in the cervix—the canal of the latter being filled with tenacious mucopus, effectually barring the ingress of spermatozoa—it is best to split the cervix as far as the vaginal vault. This will lay free the mucosa and prevent the retention of secretion. The exposed mucosa may now also be treated locally.

Even in tubal gonorrhœa the prognosis is not absolutely bad. The infection may subside without any great structural changes. If the latter occur, massage or a suitable operation may, as it has in Bumm's hands, secure the desired result.

Adenoma Tubulare Hidradenoides Vulvæ. Under the above very formidable name Pick[1] describes a special form of vulvar tumor which, up to the present time, has not been recognized. The author has seen two cases in Landau's clinic, and there is another case reported in the literature by Schickele. The tumors are small, wart-like outgrowths, varying in size from a pea to a cherrystone; they may be soft or somewhat firm; they occur single or multiple upon the large and small labia from the thirty-fifth to the forty-fifth years of life. The surface is smooth and covered by normal or reddish skin containing fine hairs. They are freely movable upon the underlying tissue, to which they are attached in a more or less sessile fashion.

Histologically the tumor is an adenoma; it extends from beneath the corium into the subcutaneous fat. It is well encapsulated when fully developed, except at certain points where it is connected with the epidermis. This connection with the epidermis varies: either there are a number of malformed excretory canals which lie side by side and lead to the surface, or the epidermis shows irregular plugs of epithelium, which here and there contain a central lumen communicating with the tubules of the adenoma. The adenoma is distinctly lobulated by penetration of fibrous septa from the capsule, which, however, do not penetrate as far as the centre. The adenomatous structure of the tumor is very much more complicated in the central part, where the tubules of the various lobules anastomose, are very tortuous, and pseudopapillæ are frequent. In this area there are also regular and irregular cystic spaces, or an admixture of cysts and tubules. Branched and anastomosing canals, having an elongated or a winding form, communicate with the cystic spaces and with peripheral collecting tubules. The origin of the growth is indicated by its histological structure. The lining of the larger and smaller tubules resembles closely that of the secreting portion of a sweat-gland—viz., an inner layer of columnar cells with basal nuclei, and beneath them a longitudinal layer of spindle-shaped muscle cells. The disposition of the layers may vary but the resemblance and identity with the structure of a sweat-gland are unmistakable. This similarity is still further shown by the contents of the tubules and cystic spaces, which consist of a serous or mucoid substance, the result of actual secretion and not of epithelial desquamation. An elastic membrana propria surrounds all of the epithelial canals of the adenoma. Pick calls this tumor (cyst) adenoma tubulare hidradenoides vulvæ—in other words, an adenoma resembling in its type the sweat-glands. It originates from malformed rudimentary sweat-glands. There is also a form of adenoma of the fully developed sweat-glands—viz., hidradenoma tubulare. There are also combinations of these two forms.

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[1] Archiv f. Gynäk., Bd. lxxi. H. 2.

A New Variety of Teratoma of the Ovary. Pick[1] recalls a case previously reported by him of an ovarian cyst which contained chorion villi and chorion epithelium. He found this condition associated with tubal pregnancy, and, after a very careful study of the specimen, he regarded the chorial tumor as entirely independent of the gravid tube. It was described as a teratoma of the ovary, containing parts of the fetal embryological envelope, and was considered the analogue of the chorioepithelial tumor found in the testicle by Schlagenhaufer. To this interpretation of Pick, Risel objected that it could not be denied that the chorioepithelial structures in the tumor might have resulted from embolic particles swept into the circulation from the tubal pregnancy. There remained but two ways, therefore, in which the existence of teratomata of the ovary containing parts of the fetal envelope (chorion) could be positively proved; first, by the presence of chorioepithelial elements in a tumor occurring in a young person in whom the possibility of pregnancy could be absolutely excluded; second, by finding this chorioepithelial tissue in direct connection with some of the other products of the fetal ectoderm. To this end the author examined some of his material, and found what he desired in the tumor of a girl aged nine years. This growth, which at the time of the first examination was regarded as a medullary sarcoma and was diagnosed as such, broke up under the surgeon's hand during enucleation. Together the fragments had a circumference about equal to that of a man's head. The fragments were in part soft and pithy, and had a whitish-yellow color; in part they were hemorrhagic and appeared necrotic. Upon examining this specimen, the portion which had been previously taken for medullary sarcoma proved to contain cells which the author has positively identified as Langerhans' cells, syncitium, and trophoblast. At the time of the first examination the teachings in regard to chorioepithelioma were yet in their infancy, and these cells were not recognized. The growth at that time, however, appeared atypical, and after the diagnosis "medullary sarcoma" a question mark was placed. At the later examination tissue characteristic of the central nervous system was found, in the whitish-yellow portion of the tumor, in direct connection with the chorioepithelial elements. The final complete examination of the tumor shows it to be an undoubted teratoma, with endodermal (glands lined with goblet cells), mesodermal (sarcomatous connective tissue), and ectodermal (central nervous system and chorioepithelial tissue) parts.

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[1] Berliner klin. Wochenschrift, 1904, Nos. 7 and 8.

Clinically the tumor was very malignant, for the child died twenty-one days after the operation. A complete autopsy was not allowed; the peritoneal cavity, however, was examined, and the viscera were found extensively penetrated and surrounded by medullary masses, in part hemorrhagic and necrotic; in part whitish-yellow. From this case and others the author concludes that the proliferation or special development of chorioepithelial cells, found in a teratoma, may produce an excessively malignant tumor. He has already demonstrated how one sort of tissue in a teratoma alone may develop to the exclusion almost entirely of the other varieties (teratoma strumosum thyreoideale ovarii). The overgrowth of chorion epithelium in teratomata of the ovary and testicle is capable of producing very malignant tumors. These growths are distinctly different from chorioepitheliomata in the sense of Marchand. In the former they bear to their host the relation of consanguinity; in the latter the relation of heredity. They may be either entirely solid or partly cystic. Pick has named them epithelioma chorioectodermale.

L. Landau[1] says that he had always had the greatest interest in malignant ovarian tumors in young individuals, and had always believed that there was something back of the peculiarities of these growths that was not entirely plain. Pick has shown that in spite of the apparent characteristic carcinomatous, sarcomatous, or endotheliomatous structure of these growths, they really belong to none of the classes mentioned, but to a well-defined class of tumors occurring in the testicle and ovary; in short, to the epitheliomata chorioectodermale. Landau has had 5, possibly 6, such cases. There are two points worthy of especial mention in regard to this sort of new-growth: first, the youth of the patients; second, the excessive malignancy of the tumors. All of the patients in Landau's series, with the exception of a virgin aged thirty-six years, were between the ages of sixteen and twenty-four years: sixteen, seventeen, twenty-one, and twenty-four years. All of the patients have died but 1; she is still alive, nine months after the operation. Three patients had metastasis to the lungs.

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[1] **Berliner klin. Wochenschrift, 1904, No. 7.**

Epithelioma chorioectodermale may be regarded, then, as a teratoma in which there are chorioepithelial elements which have developed to the exclusion of the other sorts of tissue found therein. In their metastasis they resemble ordinary chorioepithelioma rather than carcinoma, for they become distributed through the vascular and not through the lymphatic system.

It is noteworthy that the growths were unilateral in all cases: 3 of the tumors were entirely solid, while 2 contained cysts varying in size from a pinpoint to an apple. The largest tumor was the size of a man's head. The tumors were all rounded or kidney-shaped, very much the shape of a uniformly enlarged ovary, and, in addition, presented a lobulated form, with a knobby surface.

Bimanual palpation suggested a multinodular fibromyoma, but it was always possible to distinguish the uterus from the growth.

Concerning the frequency of the growth, Landau mentions 28 solid ovarian tumors removed in his clinics, which have been subjected to careful examination: 15 were fibrosarcomata or spindle-cell sarcomata; 1 was a mixed sarcoma; 2 were small round-cell sarcomata; 4 were endotheliomata, in the sense of Marchand and Pick; 5, perhaps 6, belong to the epitheliomata chorioectodermale. In other words, 15 per cent. of the growths which have been heretofore put down as "alveolar sarcoma with carcinomatous-like structures" or "endothelial tumor rich in glycogen" are really of this newly described type.

Spinal Anæsthesia. In reviewing the question of spinal anæsthesia in PROGRESSIVE MEDICINE when it first became popular, and was being rather extensively tried throughout this country and Europe, I advised a conservative policy in its general adoption until a sufficient number of cases could be collected from trustworthy sources to fully determine the advantages and disadvantages of this method of anæsthesia. To inject a toxic solution, such as cocaine and analogous drugs, into the subdural space has, from the very start, appeared to be a hazardous procedure, for when it has once passed into this canal it is beyond the power of the surgeon to limit its effects. If, therefore, toxic symptoms become manifest he can only combat this as he would any other case of poisoning

So far as the general adoption of spinal anæsthesia is concerned, its popularity is already very decidedly on the wane, and will in all probability within a short time be a thing of the past, except in rare cases, when it may still be applied. While I am not favorable to this method of anæsthesia, it is a pleasure to review the following article by Stolz upon this subject, for he has made a most careful study of a series of over 100 cases, has developed a very careful technique, and has closely noted the untoward symptoms. He has performed all of the gynecological operations from the minor to even the most grave ones, and many of them have been most successfully carried out from start to finish under the effects of spinal anæsthesia.

In considering the various drugs which may be used for cocainization, Stolz[1] says cocaine is attended with so much risk of poisoning, and the after effects are so exceedingly distressing, that it has generally fallen into disuse. Eden made 110 experiments with eighteen varieties of injection solutions and gives the following table of the relative properties of the most usual drugs:

	Lethal dose.	Analgesic dose.
Cocaine	0.01 gm.	0.0005 to 0.0001 gm.
Eucaine B	0.02 "	" 0.001 "
Peronin	0.08 "	" 0.005 "
Nirvanin	0.08 "	" 0.04 "
Tropacocaine	0.2 "	" 0.02 "

It will be seen that tropacocaine is the least poisonous of all. Schwarz, Bier, Neugebauer, and Kozlowski have all used tropacocaine with satisfactory results. Stolz's own experience embraces 155 gynecological cases. For this injection he uses a trocar and canula about 8 cm. in length and 1 mm. in diameter, and two syringes with a capacity each of about 5 c.c. These instruments are, of course, carefully sterilized and dried before use. The author has prepared, moreover, each time a number of cylindrical measuring glasses marked in centimetres (1 to 8). These are capped with other closely fitting cylindrical glasses, and each of them contains the amount of the analgesic which is to be used. These glasses are sterilized by dry heat at 120° C. for at least a half-hour before using. Stolz always employs tropacocaine. The patient should be upon the left side with the knee drawn up as high as possible against the abdomen, and the head depressed upon the breast. The entire lower part of the back is sterilized; the usual point of puncture is between the fourth and fifth lumbar vertebræ. The spinous process of the fifth lumbar vertebra is located by means of Baudelocque's pit, which lies directly below. From this the spinous process of the fourth lumbar vertebra is found. The index finger of the left hand is so placed on the fourth spinous process that the nail touches its lower border. One centimetre perpendicularly above or below this point the skin is analgesized by means of cocaine or Schleich's solution No. 2. The trocar and canula are entered at this point, and kept at right angles to the vertebral column and pressed forward so that the point reaches the middle line at a depth of 6 to 7 cm. The puncture is usually made on that side of the spinal column upon which the patient lies. This position of the trocar is preferable because the force of gravity assists in drawing off the cerebrospinal fluid; when the puncture is made on the upper side the fluid has a tendency to flow backward along the outside of the canula. In spare persons there is no difficulty in lumbar puncture, but in well-developed ones there is often considerable resistance in the muscles and fascia of the back. The practised hand in such cases is able to feel at a depth of 5 to 6 cm. a tense, tough membrane. After this is once passed; the needle glides forward without resistance. The trocar is now removed from the canula and almost immediately the clear cerebrospinal fluid is expelled either in a stream or in drops. This is received in one of the measuring glasses. The flow is assisted by having the patient cough or by raising her to a sitting position. Gently pulling the canula forward or pushing it backward may relieve an obstruction to its lumen caused by nerve fibres. In case of necessity the trocar may even be reintroduced. After a sufficient amount of the cerebrospinal fluid has been evacuated, the canula is closed by means of the trocar. The tropacocaine in the glass cylinder which has received the cerebrospinal fluid is now dissolved by stirring it with a second canula attached to the nozzle of the syringe. It dissolves very quickly. The solution is then drawn up into the syringe by means of the attached canula and care is taken to suck into the syringe also the fluid in the canula itself. The canula is now removed from the syringe and the nozzle of the latter is inserted into the butt of the first canula and the injection made. It is well to see that cerebrospinial fluid will still flow from the first canula before the injection is begun. Otherwise, the canula having been slightly displaced, the injected fluid might find its way into the epidural space, and not produce the desired effect. If more than 5 cm. of fluid has been removed, then a second syringe will be required to inject the excess of solution. The excess is drawn into the extra syringe, the first one being left in position. When the second syringe is prepared the first is removed, replaced by the second, and the injection is completed. The canula is now quickly withdrawn and the opening compressed by iodoform gauze and adhesive plaster. The first syringe may, of course, be of greater capacity (*e. g.*, 8 cm.), thus dispensing with the second one. It is, however, rather unusual to use more than 5 c.c. of the solution. Beginners in lumbar puncture may strike the vertebral arch or the lateral processes of the spinal column at a distance of 2.5 cm. from the surface. In this event forcible bending of the spinal column or directing the trocar a little farther outward will avoid this difficulty. Sometimes it is necessary to attempt a puncture in the second, third, or fifth intervertebral space. In parturient or very fat women in whom much flexion of the spine is difficult, and in the dyspnœic it is often advisable to make the injection with the patient in an upright position.

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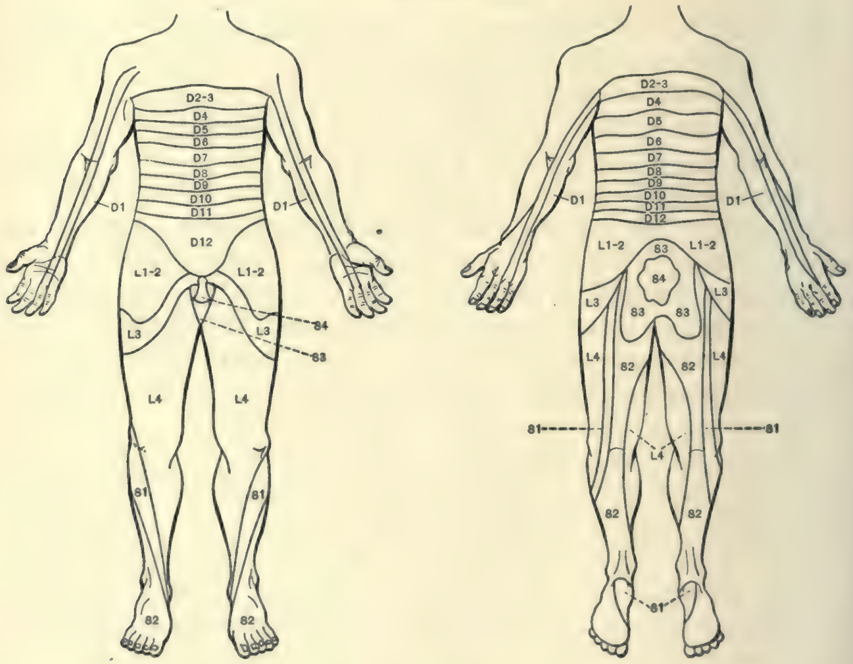
[1] Archiv f. Gynäk., 1904, Bd. lxxiii.

If the needle has been deeply inserted and there is no outflow of cerebrospinal fluid, it is likely that the needle has penetrated through the subarachnoid space into the vertebral body. After withdrawing the canula a little the entrance is freed and there is no more difficulty. At times nothing but dark blood flows from the canula. This denotes puncture of an epidural vessel, and that the opening of the canula lies in the punctured spot. In such an event the trocar had best be withdrawn and puncture made in another space. Even though the cerebrospinal fluid is blood-tinged, it may be used for the solution of the tropacocaine. Stolz has never seen any disadvantage from using it.

Marked œdema of the back, which obscures to a certain extent the anatomical points, may be obviated by a short period of massage. Contraction of the lower extremities during the introduction of the trocar shows that the instrument has grazed one of the supplying nerves.

The quantity of cerebrospinal fluid obtained by lumbar puncture varies considerably. According to Stolz's experience the intrameningeal pressure is almost always greater than the atmospheric. If no fluid flows out of the canula there is usually some fault in the technique. The author has found that the amount of cerebrospinal fluid used for injection is of importance because the more injected the higher will the anæsthesia reach. He takes as many cubic centimetres of fluid as there are centigrams of the tropacocaine. Thus 0.05 gm. of the tropacocaine is dissolved in 5 cm. of fluid; 0.07 gm. of tropacocaine is dissolved in 7 c.c. of fluid; 5 or 7 c.c. are the quantities generally used. When a smaller amount of cerebrospinal fluid is all that is obtainable, he is satisfied with it, except it be less than 1 c.c. even after puncturing the second time. If this happens spinal analgesia must be abandoned. Directly after injection of the tropacocaine local preparation for the operation should be made. During this time, in order to assist the spread of the anæsthesia, the pelvis of the patient should be slightly elevated. The anæsthesia first appears (after two to five minutes) in the genital and anal regions, corresponding to the nerve supply from the fourth and third sacral segments. Then it gradually spreads to the sacral second and first, lumbar fifth, fourth, third, second, and first, thence to the dorsal twelfth, eleventh, tenth, ninth, eighth, and seventh segment areas, as indicated by Fig. 46, taken from Kocher. In the gradual extension of the anæsthesia there is, as would be supposed, a preceding impairment of sensibility before sensation is entirely abolished. As a rule, it requires from eight to fifteen minutes for the zone of insensibility to reach as high as the navel. When this has occurred the operation may be started. If the anæsthesia does not advance that far, then the patient must be narcotized.

Fig. 46.



With the insensibility of the skin there is usually anæsthesia of the deeper tissues—in only one instance were they so sensitive that general anæsthesia was required. Customarily, however, the benumbing of the deeper tissues occurs later than that of the skin, and once in a while it entirely fails to occur. The parietal peritoneum is usually painless, but the visceral peritoneum loses its sensation of pain later, and once in a while it fails to become insensible.

The separation of adhesions is usually accomplished without pain, even though they are extensive. Separation of the bladder is many times accomplished without the least pain. Occasionally there is slight pain, which, however, does not prevent the completion of the operation, as *e. g.*, in one case of supravaginal amputation. How complete the anæsthesia of the peritoneum occasionally becomes is shown by the painless separation of inflammatory adnexa and the enucleation of a recurrent papillomatous ovarian tumor. In vaginal operations the outer genitalia, vagina, and rectum are always insensible. The cervical canal may be dilated and the uterus curetted. Quite often the change of position of the uterus incident to this procedure causes pain even though a subsequent plastic operation and cœliotomy with separation of adhesions are accomplished without annoyance. Ligation of the parametrium produces the feeling of a strong pull downward, and in one case of curettage for inoperable cancer of the cervix the penetration of the curette into the parametrium was very painful.

The analgesia persists for one-half to one and a half hours, and then disappears in an exactly reverse order from its appearance. If the sensation of touch has been abolished it reappears before the sensation of pain. As a rule, a diminished sensibility precedes the full restoration. It will be seen that the earliest and the latest effect of spinal anæsthesia is upon the genital region, and it is here, therefore, that this form of anæsthesia is most applicable. Nervous individuals who become very excited at the preparation for operation and the spinal injection are very bad subjects; a psychical effect is unavoidable and those patients who cannot be reassured often exhibit anxiety throughout the procedure. For this reason the greatest quiet should be preserved during operation and the patient's face should be covered with a towel.

Stolz has employed the technique of spinal anæsthesia which has just been detailed in 136 cases. In 100 of these cases the operation was carried out satisfactorily; in 29 the spinal analgesia was succeeded by narcosis; in 7 cases the anæsthesia was entirely unsuccessful, and narcosis had to be employed from the very beginning.

If the various operations are grouped as external, colpocœliotomy, and cœliotomy, the results of spinal anæsthesia may be thus indicated:

	Number.	Satisfactory analgesia.	Analgesia lengthened by narcosis.	Unsatisfactory analgesia.
External operations .	65	60	6	
Colpocœliotomy . .	16	9	7	
Cœliotomy . . .	55	31	17	7

In the 7 unsatisfactory cases the area of anæsthesia did not reach high enough. In Stolz's cases anæsthesia of the genital region always occurred.

It may be pointed out that among the 31 cœliotomies which were carried out under spinal analgesia there were major cases, such as for instance 3 abdominal total extirpations for carcinoma, with extirpation of the pelvic glands and cellular tissue; 2 total extirpations for myoma and bilateral malignant ovarian cyst; 3 supravaginal amputations; 9 ovariotomies, etc.

It is striking that in those cases where narcosis was required to complete an operation begun under local anæsthesia, a very small quantity of the anæsthetic was required. For example, in one radical operation for carcinoma, lasting for two hours, the use occasionally of a few drops of Billroth's anæsthetic mixture was sufficient. The patient, although not complaining of pain, was at no time unconscious, and conversed during the entire procedure with the operator. In all, 2 c.c. of the mixture were inhaled. In like manner 30 gm. of ether were used to complete a total extirpation for fibroid tumor. These cases, of course, were among the most satisfactory ones, but even in those requiring the most extensive narcosis for the completion of the operation, not more than 350 gm. of ether were used.

The dose of tropacocaine was usually 0.05 gm., and the anæsthesia produced by this in the genital region usually lasted from three-quarters to one and a half hours. Abdominal anæsthesia from this dose lasts about one-half hour. After the injection of 0.07 tropacocaine the genital analgesia has a duration of one to one and a half hours; that of the abdomen about an hour. Larger doses, besides producing insensitiveness to pain, also benumb the sense of touch and the thermal sense. The disagreeable after-effects so commonly ascribed to spinal analgesia have been but rarely encountered by Stolz. Of 136 patients but 24 complained of headache. Vomiting occurred in 6 cases; in no case was it at all serious or persistent. The amount of fluid injected seemed to have no influence either upon the vomiting or the headache. In 6 cases there was a rise in temperature above 100.5° F., but this soon subsided. In no case was there infection. A number of individual complications may be noted; 6 patients complained of thirst on the first day; 1 patient complained of pain in the leg on the side where the injection was made; in another there was paralysis of this leg for several days; two patients collapsed. Both of these were in miserable condition and had carcinoma of the cervix that was just within the bounds of operability. One of them was given a dose of 0.08 gm. tropacocaine. Sixteen days later a second analgesia with 0.07 gm. of the drug was successful and vaginal extirpation was carried out.

The after-symptoms are much more marked and annoying when sterile water or salt solution are employed than when cerebrospinal fluid is used.

Local Cocainization for Minor and Major Gynecological Operations. Webster[1] has considerably extended the sphere of employment of local anæsthesia in cases where prolonged anæsthesia is unadvisable—*e. g.*, senility, nephritic, pulmonary, and cardiac diseases, anæmia, cachexia, and sepsis. He uses Schleich's infiltration solution No. 2. The solution is made about twenty minutes before using and a small quantity of formalin is added in order to diminish the risk of infection. By this method many plastic operations on the cervix, vagina, and vulva may be performed. The uterus may even be extirpated by way of the vagina. After infiltration of the vaginal fornices and opening the peritoneum, no further anæsthesia may be necessary, but if the patient complain it is a good plan to infiltrate the broad ligaments, because ligation of the parametrium is often painful.

For the abdominal incision Webster recommends an infiltration of the skin for a distance of four to five inches, and then a rapid section of the remaining structures of the abdominal wall. He has carried out various operations, such as salpingectomy, salpingo-oöphorectomy, shortening of the round ligaments, myomectomy, supravaginal hysterectomy, appendicectomy, and resection of the intestines. During the operation the patient should be cheered and encouraged by the operator, and from time to time a few drops of chloroform may be sprinkled upon a mask. This often exerts a strong suggestive influence and the patient may believe that she is deeply anæsthetized. Rarely the patient becomes so nervous that general anæsthesia must be induced. Even so, however, the amount required will be reduced to a minimum.

Webster cites a case of hysteromyomectomy for a cystic fibroid weighing 87 pounds. This operation was begun under local anæsthesia. After working for an hour the patient became somewhat restless, consequently she was given from time to time a few whiffs of chloroform; 6 drachms of this drug were used in the remaining hour and a half of the operation, during the whole of which the patient was conscious and engaged in conversation.

The author has performed difficult vaginal Cæsarean section under local anæsthesia. He thinks that in extreme anæmia and sepsis the use of general anæsthesia greatly increases the risk to patients. He has operated for ruptured extrauterine pregnancy under local anæsthesia when the hæmoglobin had fallen to 24 per cent. In severe sepsis the tendency to cardiac degeneration and to changes in the renal epithelium should stand as a warning against general anæsthesia.

In regard to the sensibility of the different tissues Webster has made the following observations: If the infiltration has been well carried out the incision through the skin is painless. There is more or less pain in division of the other layers of the abdominal wall, but more from division of the peritoneum. Suturing or dragging upon the latter is always painful. The separation of adhesions between viscera and the parietal peritoneum, unless very slight, is always painful, whereas separation of adhesions between the viscera themselves or between a viscus and a new-growth gives little distress. Ligation, cauterization, and division of the omentum is painless, but an unpleasant sensation is produced by drawing it downward. Unless the mesentery is dragged upon forcibly no pain is experienced by handling the intestines whether they be inflamed or not. Appendicectomy is painless, as a rule. Pulling on its mesentery or separating it from the parietes, if adherent, causes pain. The broad ligaments are sensitive, as found upon compression or ligation. The surface of the uterus is insensible to pain except at the origin of the round ligaments. Any interference with the latter structures is painful. Separation of tubes and ovaries adherent to the pelvic wall causes some distress. Slight manipulation when they are free is painless. Squeezing, resecting, or suturing the ovary causes some complaint. The bladder may be separated from the uterus without much distress. Division of the vaginal wall about the cervix during hysterectomy is painful. Whereas sponging of the visceral peritoneum is painless, of the parietal it is painful according to the degree of force employed. Slow infusion into the peritoneal cavity of hot normal saline solution produces but little pain, unless the abdomen is unduly distended. Webster's observations would seem to agree with those of Lennander, of Upsala. He concludes that all pains felt within the abdomen during operation or in disease are referred to parts which are supplied by the intercostal, lumbar and sacral nerves—*i. e.*, to the abdominal walls and diaphragm and such organs as are in near relation to these nerves or are innervated by them.

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[1] Journal of the American Medical Association, vol. xlii. No. 17

DISEASES OF THE BLOOD. DIATHETIC AND METABOLIC DISEASES. DISEASES OF THE SPLEEN, THYROID GLAND, AND LYMPHATIC SYSTEM.

By ALFRED STENGEL, M.D.

THE BLOOD.

Chlorosis. It is a curious fact that within the past five years publications upon this subject have been steadily diminishing in number, so that articles are now rare indeed. This is doubtless due to a more settled conclusion as to the nature and origin of the disease, and, to some extent, to an increase in diagnostic ability, which distinguishes underlying disorders producing chloroanæmic conditions. At all events, hospital and dispensary reports mention chlorosis less often than was formerly the case. Labbé[1] looks upon chlorosis as being secondary to some other affection, usually tuberculosis, nephritis, syphilis, or some gastric lesion. Where the underlying cause is hard to find, the condition is generally that of latent tuberculosis. He specially emphasizes the occurrence of chlorosis at puberty as a pretuberculous symptom, and looks upon it as important as a history of pleurisy. This is an old view of certain French authors. Undoubtedly the chloroanæmia of phthisis has often been mistaken for true chlorosis.

In view of the diminishing number of cases of chlorosis that are reported, together with the increasing attention paid to the study of tuberculosis, this observation of Labbé's, although by no means a new one, is worthy of comment. It is erroneous, however, to say that all cases of chlorosis are secondary in the sense implied by Labbé. A new series of investigations along this line would be of great value. The researches by Mircoli[2] may be mentioned here. This author found that large doses of tuberculin injected into guinea-pigs caused destruction of the red cells, while small and repeated doses caused an increase in the erythrocytes, and also the hæmoglobin.

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[1] Presse médicale, 1904. No. 70.

[2] Gazz. deg. Osped., 1904, No. 70.

Pernicious Anæmia. There is still much uncertainty regarding the pathological basis of this disease. Whether we have to do with a toxin or an infection as the causal factor is an open question. Nor are the opinions unanimous in respect to the direct action on the blood—whether there is diminished production or increased destruction, or both, remains undetermined. While not so rare as formerly, cases of pernicious anæmia are so few, and the progress of the disease so irregular, that to keep the patients under observation up to the time of death is difficult; and, in consequence, well-studied autopsies are not very numerous. On this account the investigations of Gulland and Goodall[1] are of special interest. Leaving out of consideration the clinical manifestations of the disease (all were typical clinical pictures of pernicious anæmia) they report the pathological findings in 17 cases. These results are briefly given. The tongue was examined in only one case, and with no special abnormal finding. This is of importance in view of the well-known theory of Hunter, who lays particular stress on "a peculiar infective glossitis" as one of the important pathological conditions. It is unfortunate that the examinations of the tongue were not more numerous. In 12 cases careful study was made of the stomach and intestines. Atrophy was always present, but this was generally due to post-mortem change. Ulceration was present in one case, but the ulcer showed no special features. Colonies of organisms were noted in two cases. In all the cases examined large numbers of basophile cells with large dropsical granules in the protoplasm were found in the submucosa. No iron reaction could be obtained. The findings in regard to the atrophic condition are in accord with those of the majority of observers of the present time, who are not inclined to look upon gastric atrophy as the primary condition. The study of the stomach wall and the finding of basophile cells in the mucosa recall the observation of Strauss, who found a marked increase in the lymphocytes. In all of Gulland and Goodall's cases the liver showed both a fatty and a pigmentary change. Iron reaction was present in each case, but in addition there was always pigment, which was unaffected by this reaction. Necrotic areas were found situated usually in the middle zone of the globules. In 8 cases giant cells were met with resembling those seen in bone-marrow. Some of these contained pigment, and some were seen acting as phagocytes and ingesting red cells. In the spleen no marked or constant changes were noted in the Malpighian bodies. In the pulp a considerable variation as regards the cells present was met with; usually there was congestion. In a few cases the lymphocytes predominated. In one-half the cases large giant cells were present, ingesting both red and white corpuscles. Giant cells resembling those of the bone-marrow, were also seen in one case. In two cases the pulp showed numerous basophile cells, some of them resembling those found in the stomach. Pigment was present in all cases in varying amounts. Usually a certain proportion of these gave the iron reaction. The kidneys showed catarrhal and interstitial nephritis in every case. In 10 cases pigment granules giving iron reaction were seen in the epithelium of the convoluted tubules sometimes in a large amount. The hæmolymph glands showed marked hæmolytic change in nearly every case. Red corpuscles, ingested by phagocytes, were noted. The amount of pigment was small, and the iron reaction slight. A large number of basophiles was a striking feature. Of 6 hearts examined, 2 were apparently healthy and 4 showed fatty and other degenerative changes, but not of extreme degree. The bone-marrow was hypertrophied in all cases, and dark red in color to the naked eye. In every case a larger number of white cells was found than had been expected, thus in only 6 of the 17 cases red cells predominated; in 5, myelocytes; in 5, lymphocytes; in 1 the myelocytes and lymphocytes were equal in number and were the most numerous elements seen. There was marked evidence of blood destruction as shown by red and white cells, which had been ingested by large phagocytes, and in 7 other cases pigment giving free iron reaction was present. Giant cells were found in all cases, but they were usually small and degenerated. Eosinophile cells were numerous in only 2 cases. Basophile cells, some having the large granules noticed in the spleen and intestines, were seen in 3 cases.

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[1] Journal of Pathology and Bacteriology, January, 1905.

Gulland and Goodall summarize the relationship between the pathological appearance and the clinical features as follows:

1. The necrotic areas in the liver were more marked in the more chronic cases. 2. The more acute cases showed more iron in the liver, and in the more chronic cases a considerable amount of pigment, which did not give the iron reaction, was present. 3. There was a striking relationship between the acuteness of the case and the number of megaloblasts, both in the blood and in the marrow. 4. The cases which had shown most megaloblasts in the blood showed most megaloblasts in the bone-marrow. 5. There was no necessary relationship between the differential leukocyte count of the blood and the marrow type. In practically all cases, the blood showed leukopenia with a relative leukocytosis, while the leukocytes in the marrow were enormously increased both relatively and absolutely.

Their conclusions as a result of these studies are well worth recording: 1. The essential feature of the disease, and the criterion in its diagnosis, is that it is a megaloblastic anæmia. 2. The widespread evidences of blood destruction occurring in liver, spleen, hæmolymph glands, and marrow indicate abnormal vulnerability in the blood cells, rather than a pathologically excessive hæmolytic action on the part of so many diverse tissues. 3. The accumulation of iron in the liver is due partly to the disintegration of weakened or weakly blood corpuscles by endothelial cells and leukocytes, and partly (and to a much greater extent) to storage of iron, which is the product of red blood corpuscles, which have been disintegrated by phagocytes elsewhere. This accumulation of iron in the liver is not peculiar to pernicious anæmia, and is the usual result of the abnormal amount of blood destruction. 4. There is no direct evidence of special disease in the intestine, and the intestine need not be the primary seat of toxin production, though in certain cases, notably in bothriocephalus anæmia, it probably is so. 5. In some parts of the body a toxin is produced which acts directly on the bone-marrow, interfering with normoblastic blood formation, leading to megaloblastic formation, and acting with negative chemotaxis upon leukocytes, and especially the neutrophile variety. 6. The large red blood corpuscles produced by such a marrow, perhaps as much from their size as from inherent weakness, fall a ready prey to endothelial cells and leukocytes in the "hæmolytic" organs; notably hæmolymph glands, spleen, and marrow. 7. It is quite possible that certain individuals from congenital defect in the marrow may be especially prone to the disease, as there is little doubt that the megaloblastic degeneration represents a reversion to the fetal type.

These pathological findings are much the same as those of Warthin,[1] but the interpretation placed upon them is rather different. While Warthin emphasized the hæmolysis as the important feature in the disease, and looked upon the bone changes as secondary, Gulland and Goodall look upon the blood destruction as due to the lessened resistance of the red cells, produced by diseased marrow. This is in accord with the idea advanced by Bloch, and seems to be a more plausible conception. The findings in the bone-marrow are of special interest as going to show more or less closely related pathological conditions in many of the blood dyscrasias hitherto thought to be very distinctly separated. A case of Senator's[2] is of interest in this connection: The patient was a girl of thirteen, who gave a history of an illness beginning three months previous to the time of observation. She complained of increasing weakness, occasional dizziness, increasing pallor, loss of appetite, and later vomiting after taking food. For the last two months she had frequent headache, but the vomiting was less. The chief complaint was the extreme weakness. The family history was negative, and the patient had had measles, scarlet fever, and diphtheria. She had never menstruated. When seen the striking feature was the waxy pallor of the skin of the whole body, with a slight yellowish tinge. The mucous membranes were also very pale. There was no œdema or swelling of the glands. The spleen was not palpable, the liver normal in outline; lungs normal; heart normal in outline, with a systolic murmur most intense at the pulmonic, but everywhere audible; pharynx normal. The eye examination showed retinal hemorrhages, and pressure over the sternum was painful. Urine negative, and no tubercle bacilli in the sputum. The blood examination, October 4th, showed 1,040,000 red cells, 8000 white cells, 8 to 10 per cent. hæmoglobin. (Gowers.) No change was found in the red cells except poikilocytosis. A long search for nucleated cells was unsuccessful. All of the white cells were lymphocytes except an occasional polymorphonuclear cell. The patient died October 7th, the blood picture remaining the same: The autopsy revealed "general anæmia; hypertrophy of the left ventricle, together with dilatation of both ventricles and fatty degeneration of the heart muscle; anæmia and collapse of the lungs; chronic inflammation of the tonsils; splenic tumor; anæmia and fatty degeneration of the kidneys, and hemorrhages into the pelvis of the kidneys; chronic inflammation of the colon and rectum; gastritis, rarefying periostitis of the vault of the skull; microscopic examination of the bone-marrow from the sternum, rib, and femur showed only lymphocytes, no normoblasts or megaloblasts, no multinuclear leukocytes or eosinophiles. To the naked eye the marrow was dark red."

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[1] PROGRESSIVE MEDICINE, 1903.

[2] Zeit. klin. Med., Bd. liv. Hefte 1 u. 2.

From the clinical course of the disease and the blood examination, Senator had made a diagnosis of pernicious anæmia with aplasia of the bone-marrow. From the autopsy findings, he concludes that it was really a case of medullary pseudoleukæmia. A somewhat similar condition is present in Barlow's disease. Senator's case closely resembles cases reported by Ehrlich and Grawitz, Nothnagel, Logaros and Epstein. That there is a peculiar form of *aplastic anæmia* seems assured, but the exact classification of the condition is uncertain.

As a result of his observations, Senator concludes that *lymphatic (lymphadenoid) metaplasia* occurs in (1) leukæmia, most typically in the lymphatic form; (2) medullary (myelogenous) pseudoleukæmia or in the aleukæmic preliminary stage of lymphatic leukæmia; (3) along with the other metaplastic changes (such as increased myelocytes, giant cells, megaloblasts) in mixed forms of leukæmia (lymphatic-myelocytic form), in pernicious anæmia, and leukanæmia. This lymphatic metaplasia can lead primarily to growth or disappearance of the bony tissue, and through either to aplasia of the bone-marrow. On the other hand, it can occur secondarily as a consequence of bone disease.

Aplasia of the bone-marrow occurs (1) in severe anæmias without the typical (megaloblastic) character of the pernicious (Biermer's) anæmia; that is, in progressive aplastic anæmia; (2) in so-called Barlow's disease. This is at times curable, and stands in the same relation to progressive aplastic anæmia as the anæmias of intestinal parasites do to the pernicious (Biermer) form.

The aplasia of the bone-marrow can either be primary or secondary to bone disease, and may occur directly or by the way of lymphatic metaplasia.

Interesting as these observations are, they tend to make our conception of the subject still more confused. It is seen from the above, and from a consideration of leukanæmia, that there is a direct connection between pernicious anæmia and leukæmia, and the transformation of one into the other has been discussed by Zypkin,[1] who has been able to collect 6 cases from the literature. A study of these cases, however, shows that most of them died very soon after coming under observation, and in view of the known effect of intercurrent infection upon the number of white cells, it is conceivable that some of these cases were really leukæmia of longer or shorter duration, in which an acute disease had changed the blood picture.

The relation of pernicious anæmia to gastric digestion has long been a subject of controversy, due to the fact that in certain earlier cases a progressive anæmia was found to be associated with atrophy of the gastric mucous membrane. Stockton[2] discusses this connection or relation from observations made upon a series of 25 cases, which number comprises about one-half of those seen by him. A summary of this article has been given by Dr. Steele in PROGRESSIVE MEDICINE for December, 1904, p. 67.

SPINAL CORD CHANGES. Considerable attention has been given to the study of the nervous manifestations in pernicious anæmia, most of which can be referred to the spinal cord, and studies of the pathological conditions present in the cord are of interest. Stockton[3] in his series noted the occurrence of cord symptoms in the majority of cases. Reuling[4] reports 3 cases with histological examination of the cord, which give a fair idea of the changes met with:

Case I. A man, aged forty-six years, whose family history and previous medical history were negative. His illness dated from November, 1899, when he had an attack of fever and marked malaise, associated with severe muscular pains, which was diagnosed as influenza. The myalgia was especially marked along the spine and in the muscles of the legs. After two months he was greatly improved, but still had poor appetite and mental depression. Four months later he was taken suddenly ill with abdominal pains, vomiting, diarrhœa, and tenesmus. This was apparently due to an error in diet, and lasted only a short time. After this attacks of gastralgia were frequent and anorexia the rule. When seen in 1901 he showed the peculiar pallor of pernicious anæmia, and there were retinal hemorrhages. The nervous examination showed abolition of both patellar reflexes, the plantar reflexes being retained. There was no muscular atrophy and no disturbance of the sensation. The gait was normal. There was some ataxia of the legs. The blood examination showed 1,800,000 red cells, 7000 leukocytes, and 22 per cent. hæmoglobin. There was marked poikilocytosis, also microcytes, macrocytes, and megaloblasts. The patient died March 2, 1902, and only the cord was allowed to be removed. In all specimens there was noted a narrow strip of degeneration involving the columns of Goll and Burdach. This was most evident in the lower cervical and upper dorsal region, but extended as far down as the upper sacral cord. In specimens stained by the Van Gieson method it was seen that the degenerated fibres had lost their myelin sheaths, and very few axis-cylinders could be made out in the degenerated areas. Elsewhere the cord was absolutely normal. There were no hemorrhages, and the bloodvessels and the meninges were normal in appearance.

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[1] Wien. klin. Woch., 1903, No. 39.

[2] Journal of the American Medical Association, July 16, 1904.

[3] Loc. cit.

[4] American Journal of the Medical Sciences, vol. cxxvii. p. 520.

Case II. was that of a woman aged thirty-four years, and is interesting from the fact that the nervous phenomena seemed to precede the anæmia. She was first seen November, 1902, and stated that she had had two living children and two stillbirths, the last one being at the seventh month, and from this miscarriage she dated her illness. At this time she was confined to bed with fever, and had chilly sensations and some muscular pains, but no swelling of the joints. After seven weeks in bed she was allowed up, but still remained weak. In the early part of 1901 she seemed not completely well, but was able to attend to household duties. At this period she first noticed a sensation of cold in the right thigh, which was most marked when fatigued. Later this sensation was noted over the left thigh and buttocks, and she had at times a sensation as though a bucket of hot water was poured over the lower extremities. In August, 1901, after an accident while driving, she began to be troubled with the stomach, and with a feeling of weight in the epigastrium. She was frequently nauseated, but did not vomit. At this time she began to get pale. When seen she presented the usual external appearance of pernicious anæmia, and the blood count showed 2,000,000 erythrocytes, 9000 leukocytes, 32 per cent. hæmoglobin. In the stained specimen microcytes, macrocytes, poikilocytes, and megaloblasts, some with karyokinetic changes, were seen. The nervous examination revealed stiffness of gait, but no typical ataxia with the eyes open. With the eyes closed there was slight ataxia. Romberg's symptom was well marked; Babinski's phenomenon absent. Both patellar reflexes were absent, but the plantar reflex was retained. There was slight dulling of sensation to heat and cold over the right thigh. No other sensory disturbance; no bladder or rectal symptoms. She died January, 1903, and at autopsy the cord and brain were removed. The cord was normal to the naked eye. Microscopic examination showed well-marked degeneration of all sections of the cord except the ninth to the twelfth dorsal and the sacral regions, which involved almost the entire posterior tract of fibres, including the columns of Goll and Burdach. As in the preceding case, the change was most marked in the lower cervical and upper dorsal regions. With the Marchi stain it was found that there was considerable degeneration of nerve fibres in the right and left lateral columns, which was evidently of recent date. The anterior portion of the cord was normal, as were also the bloodvessels, nerve cells, and meninges. There were no hemorrhages.

Case III. There is practically no clinical history. The spinal cord showed several small areas of degeneration in the anterior portion. The cause of these was probably hemorrhage, as evidenced by the presence of blood pigment, and their occurrence in the anterior portion of the cord is most likely because this portion is most vascular. Reuling thinks the hemorrhage probably due to a toxin produced in the pernicious anæmia. In discussing his second case, where the nervous symptoms apparently preceded the anæmia, he thinks that in pernicious anæmia there may be two toxins—one causing the blood destruction and the other having an especial affinity for the spinal cord fibres.

THE TREATMENT OF PERNICIOUS ANÆMIA is far from satisfactory. The usual treatment is arsenic in ascending doses, which is often attended with a distinct improvement, but this in turn is so regularly followed by a relapse, even under continued arsenic medication, that it has been questioned whether the arsenic could be looked upon as causing the amelioration of the symptoms. Many authors, notably, of late, McCrae, have laid stress upon this tendency of pernicious anæmia to show wave-like periods of betterment. This is often surprising, and a patient may become quite strong and able to carry on heavy manual work, but this as a rule is not possible for any long period of time. Grawitz[1] bases his treatment upon the theory that the disease is of enterogenic origin—that is, that it is a secondary anæmia resulting from some poison acting upon the red cells, which is usually autogenous and absorbed from the intestine. Other poisons, as lead, arsenic, morphine, etc., may produce the condition, but the autogenous toxin is most common and acts upon the blood of predisposed individuals. These cases are curable by removal of the cause without the use of arsenic. He reports cases showing the results of his method of treatment. The first patient was a woman, aged thirty-eight years, who presented the typical picture of pernicious anæmia, including retinal hemorrhages, etc., and whose illness was of acute onset. The teeth were badly decayed, the bowels sluggish, no free hydrochloric acid in the gastric juice, and the motor action of the stomach was defective. The mouth was put in good condition and the diet restricted to vegetables and cereals, all of which were mashed or in the form of porridge. The stomach was washed daily with a tepid salt solution, and lemonade given freely. Nutrient enemata supplied the necessary albumin, each one being preceded by colonic lavage with salt solution. Small doses of digitalis were given early, but no other medication. The œdema had disappeared, and the hemorrhages were absorbed by the end of the first week, and at the end of the second week the blood began to return to normal, and at the end of a month she had gained eighteen pounds. During the third week the enemata were omitted and the diet increased, but all foods given were in a softened condition. This patient was discharged apparently well, but returned within a year with pyelonephritis, from which she died. The blood did not again show the findings characteristic of pernicious anæmia. Other cases are given to show the value of treatment, two of which have been under observation for from four to six years.

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[1] Deut. med. Woch., 1904, No. 30.

As I have repeatedly stated, here and elsewhere, pernicious anæmia is a secondary condition, and, that being the case, removal of the primary cause is the first indication. If this can be done, cure is not only possible but probable. That the majority of cases are curable by the methods of Grawitz is not proved by the data at hand. Even he states that the larger number do not regain their gastric HCl, and are on that account liable to remission. To speak of a cure of pernicious anæmia when achylia gastrica is yet present is hardly permissible.

Splenic Anæmia. In last year's review this subject was not treated, for the reason that but little had been offered which had not been discussed in 1903. The past eighteen months have brought forth a number of articles which, while shedding light upon the varied conditions which may accompany or be associated with splenic enlargement, have not made the subject completely clear.

Lichty[1] was able to collect 34 cases, including one of his own. Lichty's series did not include 4 cases of Scott.[2] Since then 2 cases have been reported by Stirling;[3] 1 case by Sexten;[4] 6 cases by Springthorpe;[5] 2 cases by Dock and Warthin;[1] 8 cases by Stevens;[2] 1 case by Carstens,[3] and 5 cases by myself.[4] Besides these, numerous case histories have been presented which showed a splenic tumor, but in which there was a doubt as to the proper classification.

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[1] American Medical Association, February 20, 1904.

[2] American Journal of the Medical Sciences, November, 1903.

[3] Intercolonial Medical Journal of Australasia, July 20, 1904.

[4] Ibid.

[5] Ibid.

In previous publications, both in PROGRESSIVE MEDICINE and elsewhere, I have expressed doubt as to the individuality of the disease, believing that many different sorts of disease have been grouped under the name of splenic anæmia. It is, however, wise for convenience of clinical terminology to retain the name in the hope that some order may be established in the future. As evidence of the variability of the conditions which may come under the heading may be mentioned the cases reported by me:

Case I. A male, aged fifty-nine years, with a history of jaundice twenty-two years previous, and a doubtful history of dysentery, but denying syphilis and malaria, was admitted April 18, 1900. Four and one-half years previous he began to notice patches of pigmentation of the skin alternating with lighter areas, and six months previous he had a chill and fever, which were repeated at intervals of a few weeks. He complained of dizziness, weakness, and dyspnœa for the past two months. On examination the liver and spleen were enlarged, fingers clubbed, and he had osteoarthritis. The blood showed a chloranæmia with leukopenia. On June 5th he showed slight jaundice. On November 2d the liver was distinctly smaller. He died March 8, 1902. During the period of observation he had three attacks of right-sided orchitis, several attacks of diarrhœa, hæmoptysis, and fistula in ano. Pathological diagnosis showed pigmentation of the skin and jaundice, chronic splenic tumor, atrophic cirrhosis of the liver, acute lobar pneumonia, chronic interstitial nephritis, etc.

Microscopic examination of the spleen showed decided evidences of congestion and hemorrhagic processes, both of old and of recent origin, with secondary fibroid and pigmentary changes. Besides this there were evidences of a diffuse fibroid change of an irritative character. Under high powers swollen and proliferated endothelial cells were moderately conspicuous, but nowhere forming masses. The fibroid process was widespread, involving all parts of the organ. The Malpighian bodies were extremely altered. The liver showed a pronounced grade of connective-tissue infiltration of interlobular and intralobular character. The bone-marrow showed a lymphoid appearance.

Case II. Female, aged two years and eight months. Enterocolitis at one year; little evidence of rickets; pallor, enlarged spleen, palpable superficial lymph glands, severe anæmia, at first without and later with leukocytosis; diarrhœa, terminal tuberculosis, and endocarditis; duration, one and one-half years. Autopsy: The spleen was greatly enlarged and showed numerous infarctions, either anæmic or mixed. Microscopic examination, outside of the infarctions, showed sclerosis with hyperplasia of the endothelium of the sinuses; in some places large (swollen) endothelial cells were found scattered through the spaces, and occasionally massed together. The proper splenic pulp and the Malpighian bodies were atrophied, and many of the latter converted into hyaline material. The liver showed marked lymphoidal and leukocytic infiltration between the columns of liver cells, and in areas there was an interlobular fibrosis surrounding the portal vessels, which were dilated, and here and there contained large endothelial cells similar to those found in the spleen and lymphatic glands. The bone-marrow of the femur was red in color and soft in consistence. No microscopic examination was made.

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[1] American Journal of the Medical Sciences, January, 1904.

[2] British Medical Journal, October 18, 1904.

[3] Journal of the American Medical Association, October 1, 1904.

[4] American Journal of the Medical Sciences, September, 1904.

Case III. Female, aged twenty-one years, married; two stillborn children; probable onset years before; enlarged spleen, palpable superficial lymph glands, pain in left side, slight anæmia, splenectomy, postoperative pneumonia; recovery. The spleen weighed 1230 gm. after hardening. In the fresh state it showed numerous nodular projections upon the surface, varying in size from 0.5 cm. to 3 cm., the larger ones being distinctly umbilicated. These umbilications were whitish, while the remainder of the organ was red. On section the substance of the organ was seen to have been invaded by a dense growth of a pinkish-red color, the darker substance of the uninvolved spleen showing well in contrast. It was evident, upon cross-section, that the surface nodules were not separate tumors, but projecting parts of the mass occupying the larger part of the organ. The umbilications were not due to softening, but, seemingly, the fibrous tissue of the trabeculæ had prevented elevation, which had occurred around it as the result of the infiltrating process. No necrosis was found anywhere. Microscopic examination showed marked new-growth of connective tissue, forming alveoli, containing large, clear cells with pale nuclei, some of the cells containing several nuclei. Giant cells, with centrally or eccentrically clustered nuclei, were abundant in certain areas, and small numbers could be found everywhere. The lymphoid elements of the splenic pulp were inconspicuous, being crowded into zones by the alveolar formations. These alveolar spaces were rounded, and encircled by well-marked connective tissue. At other places the transition was more gradual. The Malpighian bodies were retained in some places, but were atrophied. Elsewhere they were converted into connective tissue or had become hyaline. No tubercle bacilli could be found, nor any other organisms, animal or vegetable.

Case IV. Man, aged fifty-one years, history of malaria, stunted growth, pigmented skin, clubbed fingers and toes, enlarged abdomen (tympany), enlarged spleen, slightly enlarged liver, moderate anæmia, leukopenia, diarrhœa, hemorrhage from the bowel, rectal ulceration, tendency to chills, no malarial organisms; duration at least three years.

Case V. Woman, aged forty-four years, doubtful history of malaria; enlargement of the spleen succeeded by evidences of hepatic cirrhosis (ascites), no anæmia, hydrothorax; duration two and a half years or more. This patient was under observation for more than a year. When first seen she showed only enlarged spleen, and the evidence of liver involvement appeared a long time after this.

I have pointed out that many cases classified as splenic anæmia properly belong to one of the following conditions:

1. *Progressive Pernicious Anæmia or Intense Secondary Anæmia.* The oft-cited case of Strumpell belongs to this group. Such a type of case is reported by Zypkin,[1] presenting a symptom-complex resembling both pernicious anæmia and pseudoleukæmia. The patient was a woman, aged forty-one years. The blood examination showed 2,900,000 red cells; 23 per cent. hæmoglobin; normal number of white cells, of which 54 per cent. were polymorphonuclear neutrophiles, 2.5 per cent. eosinophiles, 27 per cent. large and 12 per cent. small lymphocytes, 6.5 per cent. non-granular mononuclear cells. The spleen was enlarged, but not the lymph glands. The autopsy showed fatty degeneration and infiltration of the liver cells, and considerable atrophy of the mucous membrane of the digestive tract. The bone-marrow changes were those of pseudoleukæmia.

2. *Pseudoleukæmia.* It has been suggested by H. C. Wood, and later by Sippy, that the condition is really a splenic variety of Hodgkin's disease. This idea is now generally abandoned, but in some of the older cases reported the descriptions go to show that splenic pseudoleukæmia may be almost identical clinically with splenic anæmia. Such cases, however, are exceptional.

3 *Leukæmia.* The occasional subsidence of leukocytosis in this disease is well known, and under such circumstances the case might present the clinical feature of splenic anæmia. By some writers splenic anæmia is looked upon as an aleukæmic precursor of leukæmia. Zypkin[2] reports a case of transition from splenic anæmia into lymphocytic leukæmia, but as his patient showed malarial organisms in the blood it is open to the objection that the blood count when first seen showed no leukocytosis because of the intercurrent affection.

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[1] Berlin. klin. Woch., October 19 and 26, 1903.

[2] Wien. klin. Woch., 1903, No. 39.

4. *Cirrhosis of the Liver.* Splenic enlargement is habitual in this disease, and there is a growing tendency to the belief that this is not due to mechanical congestion, but rather to the direct action of the same irritant which causes the liver cirrhosis. It might seem natural that in certain cases of cirrhosis an unusual degree of splenic enlargement was present. Cases of pronounced splenomegaly as an incident in cirrhosis, are probably rare.

5. *Hypertrophic Cirrhosis of the Liver (Hanot's Disease).* The long duration and considerable degree of splenic enlargement suggest, or even justify, the inclusion of some of the cases under splenic anæmia.

6. *Chronic Splenitis.* The greatest confusion exists in the case of splenic enlargement in children, which is common in rickets, congenital syphilis, and in the uncertainly classified condition called anæmia infantum pseudoleukæmica. In this group belongs the chronic splenitis of malaria. How far malaria may prove to be a factor in the etiology of splenic anæmia is unsettled. Cohen and Rosenberger[1] report a case which illustrates the possibility of malaria with enlarged spleen simulating splenic anæmia. The patient was a girl of fourteen, who gave a history of malaria two and a half years previous, while in Italy. She showed irregular fever, subsiding in the hospital (acute bronchopneumonia); greatly enlarged spleen and liver; melanoderma; hæmic murmur; nasal, pulmonary, and gastrointestinal hemorrhages; marked anæmia with low hæmoglobin; variable leukocyte count. Repeated examinations failed to reveal plasmodia until quinine was given, when the organism could be demonstrated. Cohen remarks that in Lichty's 34 cases there were 7 cases of malaria, and 2 of syphilis, and in Osler's series of 18 malaria had been present in 5. Osler excluded this as a factor on the ground of time.

Leaving out of consideration cases of splenic enlargement referable to the above groups, there are certain cases in which the splenic disease is so predominant that a separate group, or groups, is necessary. That cirrhosis of the liver supervenes in the late stages does not militate against such classification, as it has been shown that splenic disease may occasion a secondary cirrhosis. Conspicuous splenic involvement from the beginning warrants separate classification even when some evidence of hepatic cirrhosis is an early feature. The following varieties may be recognized provisionally:

1. *Simple Splenomegaly,* In a certain number of cases, including some described by Müller, Banti, Osler, Sippy, and others, the splenic enlargement is the conspicuous feature in the clinical history. Anæmia is not invariably present, though usually so, especially when hemorrhages

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[1] American Journal of the Medical Sciences, August, 1904.

occur. The hemorrhages may be caused mechanically by the spleen, or by general conditions less readily explained, as, for instance, bleeding from the gums. Pathologically this variety belongs to the category of chronic splenitis. The lesion is essentially a fibrous hyperplasia. The endothelial cells of the sinuses may be swollen, and large macrophages be present, but these are not constant. Analogy suggests a chronic infection or intoxication as causal. The disease may persist for a long time, and death occur without additional lesions; in other cases, changes in the liver develop as a final stage, which alter the clinical picture. These differ somewhat from the former in pathology, and may, for convenience, be classed separately as:

2. *Splenomegaly with Marked Constitutional Disturbances.* A certain number of cases of splenomegaly have been described in which, in addition to the splenic enlargement, there has been a profound disturbance of the general health, causing stunted growth, clubbed fingers, osseous changes, and pigmentation of the skin. French writers have reported a group of such cases in children in which the above symptoms were associated with enlargement of the liver and jaundice. Frederick Taylor has also reported such cases. More recently this subject has been gone over by von Krannhals,[1] under the caption of congenital icterus with chronic splenic tumor. Von Krannhals reports 3 such cases, and from the French and German literature has collected 23 others. The special characteristics are splenomegaly; icterus, often congenital, which varies from time to time, but the stools are not discolored, and the urine contains urobilin, while the blood-serum shows an icteroid hue; the liver may or may not be enlarged. The disease shows an extraordinary tendency to manifest itself through succeeding generations of a family. Von Krannhals has noted that in some of the cases there has not been a sufficient distinction made between the usual alcoholic icterus and congenital icterus. The latter is always associated with a splenic tumor. This author believes that while there are many points in common between congenital icterus with splenomegaly and familial icterus without the splenic tumor, a separation of the two is justifiable. Bettmann has believed the disease to be the result of an abnormal tendency of the blood to give up its hæmoglobin to the serum, and looks upon the enlargement of the spleen as spodogenous. Von Krannhals thinks with Minkowski that the splenic tumor is primary, and attributes the assumed destruction of the red cells to the action of a toxin on the liver. Dock and Warthin[2] call attention to the possibility that the clinical picture of splenic anæmia or Banti's disease may be caused by a stenosis of the portal vein resulting from an old phlebitis.

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[1] Deut. Archiv f. klin. Med., Bd. lxxi. Hefte 5 u. 6.

[2] American Journal of the Medical Sciences, January, 1904.

Banti, however, showed that changes in the splenic and portal veins may be secondary to the disease of the spleen. The family character of splenic anæmia has been well shown by the cases of Brill,[1] and by the series of cases in one family reported by Springthorpe.[2]

3. *Splenomegaly Primitive.* While this cannot be distinguished clinically, the pathological differentiation is sharp. The essential characteristic is the presence of irregular oval spaces surrounded by fibrous tissue and filled to a greater or less extent with large endothelial cells. All writers agree that these alveoli are formed by proliferation of the endothelial lining of the splenic sinuses with fibrous hyperplasia of the surrounding tissue. Concerning the ultimate fate of the large cells opinions differ as to whether they may eventually become fibrous tissue or not. In my own case such transformation seemed impossible, and the condition was rather one of active neoplastic formation. Bovaird inclined to the belief that in his case there was only an endothelial hyperplasia. The distinction between the two is difficult, and a study of splenic anæmia shows that all gradations of endothelial proliferation have been present, from a slight degree up to the condition seen in my own case, which belonged to the group which Gaucher described as primary endothelioma.

Pathology. This has already been discussed in former numbers of PROGRESSIVE MEDICINE. Three sorts of changes have been distinguished: (1) congestion, (2) fibroid transformation, (3) endothelial proliferation. The first was conspicuous in only a few instances, and was most marked in doubtful cases. Fibrous hyperplasia is a marked condition in nearly all cases, as might be expected from the late stage of examination. Endothelial proliferation is not peculiar to cases of so-called splenic anæmia. A certain amount of such proliferation is found in cases of infective splenitis of all kinds, and this doubtless contributes in such cases, as in splenic anæmia, to the fibrous change in the reticulum. A very different condition is that first described by Weichselbaum as primary multiple endothelial sarcoma of the spleen, and later by Gaucher as "epithelioma primitif," and by Debove and Bruhl as "splenomegalie primitive." The conclusion I have come to in regard to cases of splenomegaly of this last type is that they represent a primary neoplasm of the spleen somewhat comparable to diffuse myelomata and to certain infiltrating sarcomata of the liver.

Treatment. Lichty's[3] statistics show that of 25 treated medically 5 are recorded as recovered; 12 as improved; 1 not improved; 7 died, hemorrhage being the most common cause of death. Of 8 cases operated upon, 5 recovered and 3 died. The very favorable results from *x*-ray treatment in leukæmia will probably cause an attempt to treat splenic anæmia in this way. As yet sufficient time has not elapsed to enable records to be made as to the effect of such treatment. Cohen and Rosenberger[1] used the x-ray treatment in their case of splenomegaly, but it was combined with the use of arsenic and other drugs. Up to the present day arsenic seems to be the main reliance in the way of drugs.[2]

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[1] PROGRESSIVE MEDICINE, 1902. [2] Loc. cit. [3] Loc. cit.

Leukanæmia. As one of the many combinations found in blood diseases may be mentioned leukanæmia, a name suggested by von Leube to describe a morbid condition in which the clinical symptoms characteristic of pernicious anæmia are combined with blood changes and anatomical changes characteristic of leukæmia or pseudoleukæmia, whether of the lymphocytic or mixed-cell type. Such a case is reported by Weber.[3] The patient was a German, aged fifty-eight years; admitted to the hospital December 10, 1903, suffering from anæmia, progressive weakness, anorexia, and tinnitus. He had been fairly well until the year previous, at which time he began to show weakness, loss of appetite, wax-like pallor. He had never had malaria, or been out of Europe, having lived in England since 1865. He had had a chancre in 1868, but no evidences of secondaries; there had been no hemorrhage of any kind.

Physical Examination. He was somewhat fat, and very pale, the color having a yellowish tinge; lungs were normal except for a few crepitations at the base; heart normal except for a soft systolic, apical murmur. The liver was greatly enlarged, extending from the sixth rib to the level of the umbilicus. The spleen was enormously enlarged, extending beyond the right of the median line, and to below the level of the anterior superior spine. There was no ascites. The lower extremities were somewhat œdematous. The urine was negative, the bowels regular, and there was no cough or vomit.

The patient failed steadily, and the œdema increased, becoming very noticeable in the face. He died January 15, 1904. The fever had been slight, being below 100°, and the pulse ranged between 76 and 96. Repeated examinations of the urine showed a trace of albumin on but two occasions. Blood on December 10, 1903: red cells, 1,800,000; white cells, 3000; hæmoglobin, 25 per cent. There was considerable poikilocytosis. January 7, 1904—differential count: small lymphocytes, 49.4 per cent.; large lymphocytes, 9.6 per cent.; polymorphonuclears, 37.5 per cent.; eosinophiles, 0.5 per cent.; myelocytes, 3 per cent. No eosinophile myelocytes were found. In counting 400 white cells, 30 nucleated red cells were seen, 24 normoblasts, 2 microblasts, and 4 megaloblasts. On January 14th a rough count estimated the red cells at 1,200,000; white cells at 12,000. During the last days of life the leukocytes appeared to have increased.

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[1] Loc. cit.

[2] For a consideration of the splenic anæmia of infants, see Blood Disorders in Early Life.

[3] British Medical Journal, June 18, 1904.

Autopsy, January 15th. The thorax and its contents showed nothing abnormal except some pleuritic adhesions, congestion of the left lung, and a moderate amount of serous fluid in the pericardium and both pleuræ. The peritoneum showed numerous small petechiæ. The spleen weighed 60 ounces (1872 grams). The capsule was a little thickened on section; the substance appeared normal except for a nodule about the size of a cherry, which proved to be an infarct.

The liver was uniformly enlarged, and weighed 88 ounces (2496 grams); it was apparently normal to the naked eye. The kidneys showed one or two patches of sclerosis, and were normal in size and weight.

The pancreas, suprarenal glands, stomach, and intestines showed no abnormality except a few small petechiæ in the gastric mucosa. The lymphatic glands generally were not obviously enlarged, but the prevertebral tissue about the bifurcation of the aorta was studded with small red hæmolymph nodes. The majority were small, about 3 or 4 mm. in diameter, but varying sizes were seen up to 20 mm.

All of the fatty marrow of the bone-shafts was found to have undergone transformation into a red substance of unusually firm consistence. Microscopic examination was made of the bone-marrow, liver, and spleen. In the former there was found an almost complete absence of the normal fat cells; there was found a stroma of loose connective tissue containing blood myelocytes, non-granular mononuclear cells, and numerous erythroblasts. In that portion of the marrow there had been, apparently, a conversion into a kind of loose connective tissue containing conspicuous groups of erythroblasts. The author regards this connective-tissue change in the bone-marrow as one of the most remarkable features of the case.

In certain portions of the liver the columns of liver cells were separated by groups of cells composed chiefly of myelocytes, large non-granular mononuclear cells, and erythroblasts, with an occasional coarsely granular eosinophile cell, and at times giant cells. These foreign cells occupied the space normally belonging to the intra-acinous capillaries. In places they seemed to be within the vessel, but usually were without.

In the spleen the Malpighian corpuscles appeared normal; the pulp was permeated with cells similar to those in the bone-marrow and the liver, excepting that there were no giant cells. At certain spots these cells were arranged in elongated clumps, some of which were evidently within the blood sinuses.

The kidneys and pancreas showed no particular change. The hæmolymph glands resembled normal lymph glands in structure, but contained blood in the sinuses, and also the cells before described, and a few giant cells. Tests for the presence of free iron gave negative result in sections of spleen, liver and kidney.

The main features of the case may be summed up as follows:

1. Progressive waxy pallor and asthenia with maintenance of subcutaneous fat.

2. Changes in the red blood corpuscles similar to, but not so extreme as, those met with in true progressive anæmia.

3. Absence of true leukæmic changes in the blood, but presence of slight myelocythæmia and the inverted proportion of lymphocytes to polymorphonuclears as found in cases of lymphatic pseudoleukæmia (Hodgkin's disease, etc.).

4. No abnormal amount of pigment in the urine.

5. Changes found after death in the hæmopoietic tissues similar to those which occur in cases of "mixed-celled" leukæmia or pseudoleukæmia.

6. Abnormally firm consistence and increase of connective tissue in the bone-marrow from the shaft of a long bone.

7. Absence of enlargement of the ordinary lymph glands, but great hyperplasia of the spleen (hæmal gland) and prevertebral hæmolymph glands.

8. Absence of any reaction in sections of the spleen, liver, and kidneys for free iron such as is found in pernicious anæmia. Charcot-Leyden crystals were not noticed in the bone-marrow, etc., but were not specially looked for.

In spite of poikilocytosis, the disease in the present case seems not to have been secondary to any excessive hæmolysis, but to have been primary in the bone-marrow, and Weber would regard it as a myelogenic form of splenic anæmia of adults, doubtless allied to what French authors have termed "anæmie splenique myeloide." Therefore the case cannot be adduced as an example of pernicious anæmia being followed by, or becoming transformed into, leukæmia, though it is probable that similar cases have been erroneously supposed to illustrate such a course of events. It is also highly probable that similar cases, owing to enlargement of spleen and liver, have been clinically regarded (in spite of the poikilocytosis) as examples of Banti's disease. In the German cases enlargement of the hæmolymph glands was not noted.

"It is very tempting to suggest that in the present case both the spleen (hæmal gland) and the prevertebral hæmolymph glands were actively engaged in supplementing the erythrocyte forming functions of the diseased bone-marrow, but I have no conclusive evidence to support such a supposition. From what has been lately written on the subject, it seems that no really satisfactory evidence has been brought forward to show that in adults erythrocytes are produced in the spleen and hæmolymph glands either in health or in disease."

Luce[1] reports a somewhat similar case. The red cells decreased progressively from 2,428,000 to 1,152,000, while the white cells varied between 37,600 and 81,600. The hæmoglobin varied between 45 per cent. and 20 per cent. The microscopic examination showed marked poikilocytosis and anisocytosis, and many microcytes and macrocytes, and some normoblasts and macroblasts, with polychromatophilia. The leukocytes showed increasing numbers of large mononuclears, the highest count being 49.5 per cent. Only one count of the myelocytes was given, and this gave but 0.5 per cent. The autopsy revealed leukæmic infiltration of various organs, lymphadenoid metaplasia of the bone-marrow, and large numbers of the "elements characteristic of pernicious anæmia," with an entire absence of siderosis. Luce believes that the pernicious anæmia in these cases is of myelogenous origin, and that the primary lymphadenoid or myeloid metaplasia of the bone-marrow gives rise to the pathological growth in the erythroblastic tissue. He does not think that "leukæmia" deserves a special place in the diseases of the blood-forming organs, as there is only a quantitative difference between these cases and those showing less marked anæmia. He offers the theory that cryptogenic pernicious anæmia, except when the condition is primarily or secondarily due to tumors of the bone-marrow, is the result of a leukæmic metaplasia of the bone-marrow.

Leukæmia. The literature of the past year has been unusually rich in contributions upon leukæmia and leukæmia-like diseases. The discussion particularly concerns the site of the disease, and the relationship existing between the different clinical varieties. There is a growing tendency to do away with the old nomenclature, which was founded upon the clinical aspect of the disease, and to adopt a new form of classification based upon the blood findings, it being assumed by the majority of observers that all forms of leukæmia are due to bone-marrow involvement. To add still further confusion to the already rather difficult subject is the attempt upon the part of some writers to show a relationship between the pseudoleukæmic conditions and true leukæmia, the former being considered but an early stage of the latter. Inasmuch as the chief feature of the malady is an increase in the white blood cells, the study of the origin and relation of the different varieties of leukocytes is of prime importance. The older idea was that the lymphocytes are derived from the lymph glands and possibly the spleen, and as the majority of leukæmias associated with increased lymphocytes in the blood showed involvement of these organs the relationship between the two seemed plain. With increase in knowledge and improvement in methods, cases of leukæmia without splenic or glandular involvement were reported in which the only pathological condition found was a change in the bone-marrow. This led to the belief that the bone-marrow was the organ at fault in all cases of leukæmia, the involvement of the spleen and lymph glands being secondary. This assumption was borne out by the cases in which, with marked glandular or splenic enlargement, no special change was found in the white blood cells. Studies of the bone-marrow conducted by Wolff, Michaelis, Pappenheim, Rubenstein and others (all previously discussed in PROGRESSIVE MEDICINE) led to the belief that in the bone-marrow there is a parent cell from which may be derived both lymphocytes and myelocytes through various stages of development. There are varying opinions as to the exact changes which take place in this process of ripening, but for the present these can be disregarded. From these investigations various graphic schemes of cell development have been devised, as well as plans of classification to show the relationship of one form to another, all of which has been considered in previous volumes of PROGRESSIVE MEDICINE.

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[1] Deut. Archiv f. klin. Med., Bd. lxxii. Hefte 3 u. 4.

LYMPHATIC LEUKÆMIA. The bulk of the investigations have been upon lymphatic leukæmia, and especially the acute variety. Türck[1] would include under the name of "lymphomatoses" all specific, true, hyperplastic tumor formation of lymphoid tissue due to formation disturbances. Under this heading he includes lymphatic leukæmia, acute leukæmia, pseudoleukæmia, lymphosarcoma, lymphosarcomatosis, chloroma, malignant lymphoma, and, perhaps, also splenic anæmia. He calls attention to the fact that the terms pseudoleukæmia, malignant lymphoma, and splenic anæmia are names used to designate clinical conditions which resemble each other outwardly but have no pathological relationship. A large portion of these do not belong in the territory of true hyperplastic lymphomatoses. Particularly is tuberculosis of the lymphatic apparatus included wrongly under these headings. Türck mentions besides ordinary scrofulosis two other forms of lymphatic tuberculosis in which there is a generalized lymphatic tuberculosis with splenic tumor. The fundamental basis of the true lymphomatoses is increased stimulation of growth in the lymphatic system. The cause is unknown. The difference in the manifestations depends upon two factors: (1) the degree of increase in growth and its local behavior, and (2) the presence or absence and the degree of washing out of cells, resulting from the growth, into the peripheral blood. As to the local behavior of the lymphatic tissue he gives these varieties: (*a*) Enlargement with limitation and maintenance of form. Gland capsules intact;

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[1] Wien. klin. Woch., September 24, 1903.

adenoid growths in the mucous membrane are circumscribed. (*b*) Less tendency to generalization, but locally there is rapid spread to surrounding tissues. This form is malignant. Between this and the first variety all grades exist. (*c*) "Acute Growth." This shows a tendency to become general; does not tend to the formation of tumor masses; is related to the malignant type. Hemorrhagic diathesis and constitutional disturbance are marked. In a subgroup of this variety the lymphatic tissue of the mucous membranes, especially of the mouth, pharynx, and intestines, is infected. The hyperplastic lymphoid tissue allows easy access to bacteria. The lymphoid glands and spleen may be only slightly affected, or not at all.

The second characteristic of lymphomatoses is in the supply of cells to the peripheral blood. In one group all the new cells go to the formation of tumor masses, and the blood picture is unchanged. The blood finding is *alymphemic.* In a second and larger group, besides the cells making up the tumor masses, there is an increased washing out into the blood of the cells representing the product of increased growth—the lymphocytes. Depending upon the number of these cells, Türck recognizes a sublymphæmic and a lymphæmic condition. The difference is purely gradual. Türck does not deny that the bone-marrow may be involved, and even admits the possibility of this being occasionally the sole site of the disease, but he does deny the absolute dependence of the lymphæmia upon the bone-marrow changes in all cases. Kelly[1] in reporting four cases of acute lymphatic leukæmia takes the view that the bone-marrow is always at fault in all leukæmias, and suggests that we designate the leukæmia as lymphocytic or myelocytic according as the blood shows a prominence of either type of cell. Pappenheim[2] insists that there are two chief forms of leukæmia: one in which only non-granular, mononuclear cells develop in the bone-marrow, and another in which, besides these cells, there is an increase in, and increased new formation of, granular cells—myelocytes and leukocytes. The first he calls lymphoidal leukæmia and the second mixed-cell myelocyte leukæmia. According to Pappenheim there is always increased formation of the lymphoid cells along with the myelocytes, and he therefore objects to the term myelocytic leukæmia. Hamman[3] in reporting 4 cases of acute leukæmia has reviewed the literature on the subject, and has collected 124 cases besides his own up to July 1, 1903. After reviewing the list of cases he found 111 that could be considered as certain. These he divided into groups: (1) cases giving the blood formula of Fraenkel, 57; (2) cases in which the small lymphoid (the typical lymphocyte) cell predominated, 12; (3) cases impossible to classify because of insufficient blood examination, 35; (4) cases with irregular blood picture, 7. From a study of these, Hamman concludes that we have three types of leukæmia: myelocytic, lymphocytic, and the type showing the blood picture of Fraenkel. He thinks it is not justifiable to include the latter group as a subvariety under lymphatic leukæmia. The presence of typical blood pictures of the first two is an almost, but not quite, absolute indication of chronicity, while in those of the type of Fraenkel the acuteness is the chief clinical characteristic. Between the blood pictures and the clinical course of the disease there are all grades of transition. Rosenberger[1] reports a case of acute leukæmia in which the predominant cell was the small lymphocyte, and the duration was only about three months. Similarly, Leclerc[2] describes a case of acute leukæmia in which the large majority of the lymphocytes were of the small variety; and in the case of Winter and Gwyn,[3] the small and intermediate lymphocytes formed 98 per cent. of the total. Weber,[4] however, reports a case in which, while 92 per cent. of the leukocytes were lymphocytic, 56.3 per cent. were large and 36.4 per cent. were small. On the other hand, all of Kelly's[5] cases showed predominance of the large lymphocytes, as did the case reported by Miller and Hess.[6] This case was peculiar in that the patient died from rupture of the spleen.

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[1] University of Pennsylvania Medical Bulletin, October, 1903.

[2] Zeit f. klin. Med., Bd. lii. Hefte 3 u. 4.

[3] American Medicine, January 23, 1904.

It is thus seen that in the cases of acute leukæmia we have to do with all grades of proportional increase, and that this increase may affect chiefly the lymphocytes (the usual variety), but also the myelocytes, as reported by Billings and Capps in last year's review.

Regarding the diagnosis of acute leukæmia it must be borne in mind that many of the cases are atypical, and that no splenic or glandular enlargement may be present. Kelly[7] mentions the resemblance to sepsis and scorbutus, and calls particular attention to the resemblance to *typhoid fever* of cases in which the glandular enlargement is slight, and the splenic tumor not marked. He believes that some cases have been so confounded. While the diagnosis can be made from the blood examination a single enumeration is not always sufficient. Thus, in one of Kelly's cases the leukocytes in one examination were as low as 5200, yet the differential count showed over 90 per cent. of lymphocytes.

Acute Leukæmia in Children. The occurrence of acute leukæmia in children has not been so frequently reported as in adults, but this is probably due to a failure in making the necessary examinations. In

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[1] American Journal of the Medical Sciences, October, 1904.

[2] Lyon Médicale, February 14, 1904.

[3] University of Pennsylvania Medical Bulletin, April, 1904.

[4] Transactions of the Pathological Society, London, vol. liv.

[5] Loc. cit.

[6] American Medicine, March 5, 1904.

[7] Loc. cit.

1900 McCrae described a case and was able to collect 13 others. Hutchinson[1] gives notes on 2 cases and has collected 12 more, besides those of McCrae. Churchill[2] publishes one case and reports 14 others not given by McCrae. It is very probable that Hutchinson and Churchill report on some, at least, of the same cases. Finally, Savory[3] reports a case in a boy of four and one-half years, who died in less than two months from the date of onset. The age of the children reported varies from eight months up to ten years. The symptoms and clinical course of the disease are much the same as in the adult, always terminating fatally. Hutchinson, following the plan adopted by Guinon and Joly, describes three types of cases: first, those showing profound anæmia with general glandular enlargement, and exhibiting a hemorrhagic tendency in the later stages of the disease; second, those in which the hemorrhagic character is manifest from the outset, petechia appearing early, so that the case may resemble one of infective purpura; and third, pseudoscorbutic cases, in which lesions of the buccal cavity are the most striking feature.

CHRONIC MYELOGENOUS LEUKÆMIA. Comparatively little attention has been given to this variety of leukæmia, due, perhaps, to the fact that it is relatively frequent in the adult, and also that there is unanimity of opinion as to its pathogenesis, if we except Löwit, who stands alone. It is of interest, however, to note the great infrequency with which this variety occurs in children. Hutchinson[4] calls attention to this fact, and could find in the literature but four cases, to which he adds one of his own. This was in a girl of four years and eleven months. She showed no excessive pallor, and the liver and lymphatic glands were not palpable. The spleen was enormously enlarged. The blood showed 2,425,000 red cells; 25 per cent. of hæmoglobin; 1,590,000 leukocytes. Of the latter 56.1 per cent. were neutrophile myelocytes; 3.9 per cent. basophile myelocytes; 9 per cent. eosinophile myelocytes; 30 per cent. polynuclears; 0.7 per cent. lymphocytes. In only one recorded case did the condition appear during the age of infancy. This was a case reported by Monti and Berggrün in a child of one year. It had congenital syphilis and rickets, and showed very marked splenic enlargement, and some increase in the size of the lymphatic glands. The red cells numbered 1,846,000, and the white cells 66,422. Of these the great majority were large nuclear forms with fine neutrophile granules. The eosinophiles were increased, but the polynuclears and the lymphocytes were diminished. This infrequency, according to Hutchinson, might suggest that the cause of myelogenous leukæmia was not operative at this time of life.

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[1] Lancet, May 19, 1904.

[2] American Journal of the Medical Sciences, October, 1904.

[3] Lancet, February 6, 1904.

[4] Loc. cit.

Influence of Complicating Diseases upon Leukæmia. It has long been noted that intercurrent affections in cases of laukæmia at times produced very distinct changes in the original ailment, and especially in the blood picture. Observations upon this topic have been published from time to time in this journal. Recently Dock[1] has reviewed the entire subject, and from his investigations has brought to light some interesting facts. One of his own cases is of special interest because of the thoroughness with which the blood was studied before, during, and after the infection. The patient was a woman of forty-two years, whose present illness began about two years before coming under observation. She was first examined December 29, 1896, when she presented all the physical signs of myelogenous leukæmia, the liver and the spleen being enormously enlarged. The blood count at this time showed: red corpuscles, 2,500,000; white cells, 367,000; hæmoglobin, 50 (Fleischl). The differential count of the leukocytes gave: lymphocytes, 0.3; mononuclear neutrophiles, 48.8; polynuclear neutrophiles, 41.6; polynuclear eosinophiles, 0.7; mononuclear eosinophiles, 1.4; basophiles, 2; degenerated, 5. The diagnosis of myelogenous mixed-cell leukæmia was made and she was given arsenic. On February 1, 1897, she was again seen, complaining of great weakness, dyspnœa, pain in the left side, and general itching. She gave a history of having had influenza two weeks before, with tonsillitis and coryza. At this time physical examination showed moderate redness of the pharynx, a few rales in both bases, and soft systolic murmur over the base of the heart. The spleen was markedly smaller in size than it had been previously, was tender on pressure, freely movable, and over it could be felt a distinct fremitus. The blood count showed only 7500 white cells, the red cells and the hæmoglobin being practically as before. She had been taking arsenic up to 12 drops t. i. d., and this was continued along with 4 c.c. of bone-marrow t. i. d. A differential count made on the following day showed the 8125 leukocytes to be composed of small lymphocytes, 4.2; large lymphocytes, 5.7; transitional and large mononuclear cells, 4.9; polynuclear neutrophiles, 70.6; myelocytes, 12.3; degenerated, 6. There were no eosinophiles or basophiles found. On February 12th the leukocytes numbered only 5000. On March 12th they numbered 35,156, and the spleen and liver showed practically no enlargement. The leukocytes increased in number until on June 4th they numbered 307,000, but the spleen and liver remained of normal size. At this time she was seized with chills, which were repeated several times, and for the next three weeks had considerable fever and severe pain in the region of the spleen, which required morphine. On July 1st the spleen and liver were again noted as being enlarged. Subsequently both became smaller. The liver returned to its normal size, but the spleen, with periods of reduction in size, became larger and larger, until the patient died about June, 1898. The last year of life showed fluctuation in the leukocyte count down to 57,000, but toward the end the count was high, reaching beyond 200,000.

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[1] American Journal of the Medical Sciences, April, 1904.

Cases of Tuberculosis and Leukæmia. In discussing this combination, Dock mentions the fact that the occurrence of the two diseases in the same patient was noted as early as 1849 by Virchow, and that tuberculosis occurred in 12 out of 100 cases of leukæmia analyzed by Martin Ehrlich in 1872. In more recent literature the combination is less frequently reported, but Dock is of the opinion that the infrequency is not so great as has been generally held. There is some difficulty in establishing a diagnosis because the cases of leukæmia stay so short a time in the hospitals, and the clinical symptoms of the tuberculous infection may not be well marked. Thus, in Dock's own cases, 25 in number, clinical evidences of tuberculosis were not found in any, but in 2 out of 6 autopsies miliary tuberculosis was found. He is inclined to the opinion that more extensive observations will show that the combination may occur fairly often. A point to be borne in mind is that small leukæmic growths may resemble tubercles, and on that account the studies prior to 1882 are unsatisfactory.

From the literature Dock has collected 27 cases, to which he adds 2 of his own, making 29 in all. From a study of these he concludes that chronic tuberculosis does not materially alter the course of leukæmia, nor does it influence the leukocyte formula. Acute miliary tuberculosis, on the other hand, is followed by, or associated with, a reduction in the leukocytes in the majority of cases. The exceptional cases may be due to the slight development of the miliary tuberculosis in extent, or to the fact that death occurs before there is time for the change to take place; or, finally, as has been suggested by De Roth, the body becomes accustomed to the infection, and the leukocytes are not affected as in more acute cases. One of Dock's cases was a woman, aged twenty-five years, who was first seen June 2, 1896. She had been ill for a year, the abdomen being enlarged for nearly that length of time. She showed a mixed-celled leukæmia with 598,000 leukocytes. There were large ecchymoses about the anus and on the legs. The spleen was greatly enlarged. The liver was not enlarged; the axillary and cervical lymph glands were increased in size, but no enlargement was found in the inguinal glands. The ecchymoses disappeared in three weeks, and she improved somewhat. She was under observation for two years but the leukocyte count was unchanged. She passed from observation, and came to autopsy a year later. The spleen was enlarged, but the chief picture was that of a severe tuberculosis of the serous membranes. The blood showed no increase in leukocytes, and microscopic examination of the tissues revealed a complete absence of leukæmic changes except in the bone-marrow, which was lymphoid. In a second case, a man aged twenty-nine years, who died with so-called leukæmic apoplexy, there was no decrease in the number of leukocytes up to the time of death. At autopsy a recent slight miliary tuberculosis was found.

Miscellaneous Infections. Including his own case, Dock was able to find reports of 23 cases of leukæmia in which an intercurrent infection other than tuberculosis had occurred.

In medullary or splenomedullary leukæmia the infections reported were typhoid-like disease; afebrile typhoid; erysipelas; erysipelas, streptococcus and diplococcus infection with miliary tuberculosis; sepsis; empyema; influenza; peritonitis. In lymphatic leukæmia, generally the acute form, there are reported: sepsis, angina; angina (streptococcus); streptococcus infection, sepsis (staphylococcus); colon bacillus; staphylococcus and colon; pneumonia. Chronic lymphocythæmia has been observed, complicated by pneumonia and by bronchitis.

The behavior of the leukocytes in these cases was as follows: there was marked decrease near or to the normal number in 11; a relatively slight fall occurred in 9; in 3 there was no change, or even a rise was noted. Comparisons between the cases are difficult as they differ so much in detail, and in many of them more than one infection was present. It is of interest to note that in three cases in which during infection there was a rise in the leukocytes, death occurred soon after. It is possible that there might have been a fall if the cases had ended less abruptly.

The earliest period after the complication has rarely been carefully observed, and should be thoroughly studied in the future. From a full consideration of the reported cases it is apparent that in the majority of instances intercurrent infection causes a decrease of the leukocytes in leukæmias of various kinds. The fall may be so slight as to leave the gross picture of leukæmia unchanged, but in about half the cases the white corpuscles fall to normal or below. It is interesting to note the extreme leukopenia that occurred in some cases; thus, in two instances a fall of 600 was noted, and in one case reported by Cabot the white cells were reduced to 471. Besides the leukocyte decrease, the enlarged organs became smaller; sometimes the diminution in size was earlier, sometimes later, and sometimes coincident with the diminution in leukocytes, and sometimes the organs became smaller without any change in the white cells. The diminution may be very rapid. It is often difficult to distinguish between this change in the organs and that observed in some cases of leukæmia a short time before death.

Concerning the qualitative change in the leukocytes it is difficult to draw conclusions, as in the reported cases the variations have not been uniform.

There is a tendency to the disappearance, more or less completely, of the leukæmic character of the blood under the influence of infections, and to the increase of the polynuclears, absolutely as well as relatively.

Changes in the Red Blood Corpuscles. These changes have not been thoroughly studied in complicated leukæmias. Out of 18 cases, of which full reports are given, there was a rise in the number of red cells in eight instances, simultaneously with the fall of the leukocytes. The difference was often slight, but in six it was over 500,000. It should be borne in mind that great variations in the red cell count occur in uncomplicated leukæmias. It is of interest to note that four cases in which a marked increase in the red cells occurred were cases complicated by tuberculosis.

The period at which a change in the blood picture occurs after the onset of infection cannot be definitely determined, because of the few cases in which the process could be observed from the beginning. In general it may be said that the fall occurs soon after the infection, more promptly in acute than in chronic infections. The cases of chronic infections, however, are too few and too diverse in character to permit of sweeping conclusions.

The Effect of Various Processes Other than Infections on Leukæmia. Most of these observations have been carried on with a view to determining the therapeutical effect of certain remedial agents. A large number were experiments with arsenic, and certain cases under the effect of this drug showed a marked and rapid diminution in the leukocytes. Thus, in one of Thayer's cases the leukocytes fell from 714,000 to 7500 in twenty-three days. The leukocyte formula was changed, showing a relative increase of lymphocytes and polymorphonuclears, and a diminution in the myelocytes, though these were still present. Somewhat similar cases have been reported by Bramwell, Cabot, and others. McCrae reports a case in which the white cells fell from 584,000 to 5000 under the influence of arsenic, and myelocytes entirely disappeared. A case similar to this is reported by Taylor. Other drugs have been found to have somewhat the same effect, such as thyroiodin, quinine, and tuberculin. In a case in which cinnamic acid was used there was an increase of leukocytes from 170,000 to 560,000. A decrease was obtained by the use of splenic extract. Similarly, a marked decrease has been reported as the result of massage of the spleen. Various theories have been advanced to explain the condition.

THE TREATMENT OF LEUKÆMIA BY THE *X*-RAYS. Within the past year a large number of articles have been published detailing the effects produced upon leukæmia by the Roentgen rays. The entire literature upon the subject has been covered by Dock.[1] Senn was the first to draw attention to this form of treatment in August, 1903. From our knowledge of the effect of the x-rays upon certain morbid growths, as carcinoma, it would seem that the thought suggesting the use of the rays in leukæmia would have been a desire to get rid of the tumor-like growths characteristic of the disease; Senn, however, used the x-rays to destroy certain organisms which he thought stood in relationship to leukæmia. Dock was able to collect, and has studied the reports of, 29 cases, but he states that there have probably been many more which, up to the present time, have not been fully described. Of the reported cases, 2 were of the acute lymphatic type, both of which resulted in death. Capps and Smith have thought that acute cases were not proper subjects for the x-ray treatment. Five cases of chronic lymphatic leukæmia have been reported as having undergone this treatment, and of these 1 died after sixteen months, 1 after eight months; 1 improved; 1 has been under treatment for five months with marked reduction in the size of the spleen and glands, and a diminution of the leukocytes from 150,000 to 4200; while in the last case, after eight months' treatment, the spleen and glands are practically normal and the leukocytes show a reduction from 295,000 to 6800.

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[1] American Medicine, December 24, 1904.

There are 21 reports of the mixed-cell, myelogenous, or splenomedullary cases. Some of these cannot be used in the way of analysis. Of the 21 cases, 11 showed a reduction of the leukocytes under treatment to almost the normal number. In 7 others there was a marked reduction, but the leukocytes still remained high enough to suggest leukæmia. It is an important fact that in only two-thirds of the cases was there such a fall in the number of leukocytes as to justify a claim to marked improvement, so far as the number of the leukocytes can be used for that purpose.

Technique of Treatment. This has varied considerably in the different cases. Some of the patients have been treated only over the spleen; others over the spleen and epiphyses of the long bones, or the long bones themselves, and the sternum. In none of them was the treatment applied only to the bones. Dock himself is trying this method with unsatisfactory results. Oliver saw less effect from treatment of the bones than from that of the spleen. Good results have followed from treating the spleen alone. Others, as Evans and Dunn, did not have as good results from treatment of the spleen alone, but quite as good as several who treated the bones as well as the spleen.

Regarding the length of time of the single exposure, there has not been very great difference in the cases. This factor must be determined by subjective or objective reactions in the skin. Exposures of ten to twenty minutes have been the most frequent, and these have been repeated every day, every other day, or even less frequently. It is impossible to estimate the dosage of the Roentgen rays because of the lack of special details in many cases, and the contradictory results. The points that should be considered, in reference to the dosage, are the degree of vacuum of the tube used, the distance of the anticathode from the part exposed, the time and frequency of exposure, and the value of the exciting current. Future investigations will have to determine the best plan to follow. Among the cases, tubes of low, medium, and high vacuum were used, and in all of these good results were obtained. Theoretically, a hard or high vacuum should be better in the treatment of internal organs, because the rays are supposed to traverse the superficial tissues and affect the deeper ones. With hard tubes also there is less danger of burns.

Qualitative changes in the white cells have not been as thoroughly studied as could be desired. In 5 of the reported cases the leukocytes are described as normal, or it is specifically stated that myelocytes were absent in the stage of apparent recovery. In other cases, despite the improvement, myelocytes were still present in the blood in considerable numbers. Still less attention has been given to the changes in the red blood cells. Out of 12 of the myelogenous cases, a gain was noted in all but one. The hæmoglobin usually increased with the red cells.

The effects on the glands and spleen are often striking. In all of the chronic cases the glands diminished. The change in the spleen was not uniform in all cases. Among patients with a normal number of leukocytes the spleen diminished markedly in 8, and moderately in 3; in the others, the spleen was much reduced in 1, moderately in 4, little or none in 2. It must be remembered that in certain cases marked connective-tissue overgrowth may prevent the organ from resuming its original size.

The effects resulting from *x*-ray treatment are difficult to describe in exact terms. In most cases there was marked improvement in the subjective sensations, while œdema often quickly disappeared. The general improvement was sometimes marked when the blood and spleen were but little altered; thus, in the case of Cheney,[1] a patient who had been under observation six months without improvement, and who showed marked symptoms of pallor, weakness, shortness of breath, and abdominal distention, improved very rapidly under the *x*-ray treatment. At the end of two weeks he felt much better, did not tire so easily, could walk farther, and could eat without abdominal distress. By the end of two months he felt perfectly well, had lost his pallor, looked well, and had gained ten pounds in weight. It is interesting to note that in this case the spleen was not materially changed in contour. The leukocytes varied between 70,000 and 90,000, and the myelocytes, at their lowest, were 27 per cent. The red cells increased from 2,508,000 to 4,750,000 and the hæmoglobin from 47 per cent. to 75 per cent.

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[1] Medical News, November 5, 1904.

Deaths and Toxic Effects. Of the 18 myelogenous cases 5 died, some of the deaths having occurred among patients apparently most improved. Toxic symptoms have been noted in several; in most of these the toxic symptoms developed subsequent to dermatitis, though it is difficult to connect the two in a causal relationship.

Conclusions. Under treatment with Roentgen rays some cases of leukæmia undergo marked change for the better. The leukocytes fall to normal numbers and sometimes show no more pathological cells, the red blood corpuscles improve, the enlarged spleen and lymphatic glands resume normal proportions, and the general health seems restored. In some cases the effects are imperfect.

In no case has observation been carried out long enough to speak of cure. In several cases death has occurred while the symptoms seemed to indicate improvement. The mode of action of the Roentgen rays is not known. It probably consists in affecting the tissues that produce the pathological leukocytes, either directly or more probably through the production or setting free of substances that affect cell formation, or degeneration, or chemotaxis, or all of these processes; but further investigation is necessary. At present the improvement must be considered functional and not affecting the original cause, nor in a permanent way the morbid histology of the disease. The improvement of the red blood cells may be due to general stimulation of nutrition, in which suggestion may have a part, or by diminution of lymphoid or myeloid tissue, and thus permitting development of red cells, as suggested by Ahrens.

Though the change seems a functional one it is possible that treatment in very early stages may be more effective than it has hitherto been.

Roentgen ray treatment of leukæmia is dangerous on account of the usual risk of dermatitis and burns, but probably also on account of toxic processes as yet impossible to explain. No stronger claims can be made for it than can be made for arsenic and certain serums and bacterial toxic substances, but it may prove more certain in its action than arsenic and can be more readily applied in practice than the injection methods. Careful observation and recording of all cases in which the treatment was followed promise advances in our knowledge of leukæmia, with the possibility of gains in practical therapeutics.

No special rules can be laid down at present for the treatment with Roentgen rays. Great care should be taken to avoid burns. Methods should be as fully described as possible in each case; the blood should be carefully examined as fully and as frequently as possible, and, if possible, urine examinations should be made, to throw additional light upon the metabolic changes.

Chloroma and Leukæmia. The occurrence of this malady is rare, but within the last few years a sufficient number of cases have been collected to justify its being looked upon as a clinical entity, and to permit of a fair description. This is of importance because of the fact that in only a few instances has the disease been diagnosed ante-mortem. George Dock and Aldred Scott Warthin[1] report a new case, and give the cases reported since 1893, at which time all the instances then recorded were published by Dock. In the first paper there were records of 17 cases, and in the present article 22, including their own case, making 39 in all. Several other cases have been spoken of, but not formally reported. The statistics from these cases are of interest in showing the characteristics of the disease.

The average age of onset is below twenty years, the earliest being at ten months and the oldest at fifty-two years. The average duration was five and a half months, the shortest duration being one month and the longest eighteen months. Nine cases occurred in females and 29 in males. The peculiar green, tumor-like growths show special predilection for the skull, which was affected in all but two cases. Other sites are the sternum, vertebra, bone-marrow, liver, kidneys, and spleen. Usually the lymph glands are involved, as may be almost any organ or tissue. In the bones the tumor formation is most common in connection with the periosteum. At times the skin may also be involved. The chief clinical features as summed up by Dock in his former publication were: "The appearance, usually before the age of twenty, of anæmia without evident cause, with loss of strength, dyspnœa, and emaciation, hemorrhages in the skin, the mucous membranes (epistaxis), or internal organs (retina); rapid pulse; ocular symptoms, such as difficulty of vision, strabismus, and especially exophthalmos, without the special features of Basedow's disease, and with tumor in the orbit; deafness and ringing in the ears, and tumors in the temporal regions, or in the cranium, or in other parts of the body." In the clinical histories of eighteen patients in the last series, early weakness was noted in nine, pallor or anæmia in eleven, exophthalmos in eleven, swelling and eversion of the lids in another, deafness in ten, swelling of the temporal region in nine, swelling of the face in three more, enlarged lymph glands in eight; emaciation in six, rapid pulse in six. Pain was often a prominent symptom, and was most often felt in the head, eyes, teeth, or ears, or in the hips or legs. Hemorrhages in the skin or mucous membranes were noted in 8 cases. Blindness occurred four times. The liver was enlarged in 3, the spleen in 7 cases. *Albumose* (Bence-Jones) was present in Weinberger's case. In both of Rosenblath's it was absent.

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[1] **Medical News, November 19 and 26 and December 3 and 10, 1904.**

In other cases there are no evidences for or against. It is noteworthy that in the 3 cases cited the bone marrow was altered.

Concerning the blood finding special attention is given to the behavior of the leukocytes, because of the resemblance which chloroma bears to leukæmia. The red cells are reduced in number (to 509,600 in Dock and Warthin's case), and the hæmoglobin percentage low (15 per cent. in the same case). There may be occasional normoblasts or megaloblasts, and basophilia may be present. The changes in the red cells are not marked. They take the usual stains well, and in general show little that is characteristic. The leukocytic changes have been of a varying kind. Most often there was found a leukocytosis, varying in amount up to 491,600, but usually below 50,000. The most important change consisted in a relative and absolute increase in the lymphocytes, often with the appearance of a lymphocyte-like cell resembling those found in the bone-marrow. This increase in lymphocytic cells may occur even when the total number of leukocytes remain within normal limits, as in a case of Bramwell's. The behavior of the colorless corpuscles has led to the confounding of chloroma with leukæmia, especially acute leukæmia, and Dock and Warthin are inclined to the view that there is a definite relationship between the two diseases. Unfortunately, the course of the blood changes from onset to termination has not been studied as yet, so our knowledge of the hæmatology of the disease is too incomplete to justify very definite statements. The tendency, however, is to look upon all diseases accompanied by lymphoid hyperplasia as being more or less akin. The conclusions of Dock and Warthin seem to be justified.

1. *Chloroma is a tumor-like hyperplasia of the parent-cells of the leukocytes, primary in the red marrow, the periosteum being involved only secondarily.* The possibility of a primary chloroma, in any part of the body in which white cells are formed, must be considered.

2. As a result of this leukoblastic hyperplasia, atypical leukocytes or leukocytes corresponding to some one of the normal types, may appear in the circulating blood in varying number. Chloroma is, therefore, to be classed with the leukæmias.

3. The white cells resulting from the atypical proliferation may in different cases attain different stages of differentiation. In some cases they may be of the large lymphocyte type, in others of the type of neutrophile or eosinophile myelocytes. At different stages of differentiation atypical forms may be produced. Whether a small lymphocyte type exists remains to be more definitely shown.

4. It is evident, therefore, as in the case of other leukæmias, that the blood picture in chloroma may be very varied, and if this be used for a basis of classification it is possible to designate different varieties of chloroma.

5. It is also possible that in certain cases, or possibly stages, of chloroma the hyperplasia of the parent cells may reach such a stage that the new forms do not get into the blood stream in such numbers as to give the picture of a leukæmia. An aleukæmic chloroma is, therefore, possible.

6. The essential difference between chloroma and other forms of leukæmia is the more marked neoplastic character of the former, and the formation of the green infiltrations and metastases. The following classification of chloroma is, therefore, proposed:

Chloroma (chloromatous leukæmia).
- **1. Aleukæmic chloroma (?).**
- **2. Leukæmic chloroma.**
  - **1. Small lymphocyte type (?).**
  - **2. Large lymphocyte type.**
  - **3. Neutrophile type.**
  - **4. Eosinophile type.**
  - **5. Atypical.**
  - **6. Mixed.**

7. Chloroma is probably to be regarded as a more malignant form of leukæmia. The white cells resulting from the atypical proliferation have the power of multiplying in the blood streams and in the tissue spaces, thus giving rise to masses of cells having the characteristics of metastatic tumors. It is probable that the proliferative activity is proportionate to the lack of differentiation. In the neutrophile and eosinophile forms we should expect a less marked tendency to proliferation; on the other hand, the large lymphocyte and atypical forms would show a greater proliferative capacity, and hence be more malignant. The aleukæmic types theoretically would be the most malignant of all, and present characteristics more closely allying them with the sarcomata.

8. The atypical hyperplasia of certain of the elements of the bone-marrow leads to the crowding out and replacement of the erythroblastic elements, and a consequent lessening of red-cell formation. Chloroma is, therefore, attended by, and is the cause of, a severe *anæmia,* to which the chief symptoms of the disease are probably due. This anæmia, while it may resemble pernicious anæmia in many ways, is essentially *an anæmia of deficient hæmatopoiesis and not of excessive hæmolysis.*

9. The malignancy of chloroma depends, therefore, chiefly upon the replacement of the red marrow and the consequent diminished red cell formation. The slight antagonism between the new cells and the body cells would otherwise place it among the relatively benign growths, except in those cases in which important nerve structures are injured by compression by the infiltrations, or through rarefaction of the bones. The large numbers of degenerating white cells present throughout the body may possibly give rise to an intoxication.

10. The cause of the green color remains unknown. It is probably a parenchymatous color. It is possible that processes morphologically

like chloroma may lack the characteristic green color. Such cases should be classed with the non-chloromatous leukæmias.

11. While classing chloroma temporarily as a unique form of neoplasm the question of the ultimate etiology of the process is not settled. At present intoxication or infection can no more be ruled out than in the case of carcinoma or sarcoma. We are in the same position here as in the case of neoplasms in general.

Disorders of the Blood in Early Life. Hutchinson, in his Goulstonian Lecture,[1] takes up in detail the consideration of the physiology and pathology of the blood and the blood-forming organs in early life. The blood picture of infants differs normally from that of adults, as is well known. At birth the red cells number 6,000,000, reaching 5,000,000 by the end of the second week. The hæmoglobin at birth is 110 per cent., and falls gradually in proportion to the diminution in red cells, reaching the normal, 100 per cent., at the end of the second week. After the second week the course of the red cells and the hæmoglobin is no longer parallel; the hæmoglobin falls gradually, reaching its minimum of 70 per cent. at the sixth month, and stays at this level until about the beginning of the second year, when it slowly rises, reaching the adult standard at the sixth year or later. The blood is, therefore, comparatively chlorotic in type, and this fact is of importance in the study of blood disorders, on account of the readiness with which this physiological condition becomes exaggerated. The author lays little stress on the histology of the red cells, the tendency to inequality in size he thinks explainable on the ground that they are very rapidly produced, and that these inequalities are probably of little importance. He thinks that the red cells of the child are probably more vulnerable than those of the adult. He also calls attention to the wider extent of the red marrow in childhood. This is of importance as pointing to the fact that the whole of the marrow of the long bones in childhood is already occupied in the manufacture of red cells, and there is, consequently, no reserve power formation as in the adult. This may account for the fact that children stand hemorrhage badly, and tend to become anæmic on slight provocation.

The Leukocytes. It is of importance in examining the white cells to note not only the percentage proportions, but the total number as well, because the high percentage of any one kind of cell, due to an absolute count of its numbers, may make the other cells appear relatively diminished, while in reality their absolute number may be unaffected. In the newborn infant the total number is 20,000; this is shown to be due to the high absolute number of polymorphonuclear cells. At the end of the first week this number falls to about 10,000. A second rise now occurs which persists until the sixth month, this being due to increasing mononuclear cells, chiefly lymphocytes. After the sixth month the total number of lymphocytes slowly declines, and with it the total number of leukocytes, until about the sixth year, when the adult proportion is reached. In other words, we have during the first week a polymorphonuclear leukocytosis which rapidly diminishes, so that by the end of the first week the polynuclear cells number about 5000, which number they maintain throughout life. The mononuclear cells show a gradual rise from the beginning of the second week, reaching its culmination at the sixth month. They then fall, and at the end of the third year about equal the number of the polynuclear leukocytes, but do not reach the stationary—about 2000 per c.c.—until the sixth year, which number persists.

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[1] Lancet, May 7, 14, 21, 1904.

The significance of the initial leukocytosis is not understood. The fœtus in the last months preceding birth has a fewer number of cells than the mother. The increase in the polynuclear cells is a phenomenon connected with birth.

"If I may gather these preliminary observations on the process of blood formation and its results in infancy to a focus I would say: 1. That the red marrow at this period of life is engaged almost to the limit of its functional capacity in the production of red cells—cells, however, which are individually less richly charged with hæmoglobin than those of the adult. 2. That the production of granular forms of white cells goes on as in the adult in the marrow and apparently at almost the same rate of activity. 3. That the non-granular cells, on the other hand, are present in the blood of the infant in markedly larger absolute numbers than in the adult, and, corresponding to this, the adenoid tissue which is concerned in the production of these cells is extremely abundant, active, and widely diffused. 4. That although this specialization of function on the part of the two great blood-forming organs—the marrow and the adenoid tissue—has taken place in the child as in the adult, yet the former—standing nearer the period of fetal life—may be expected to be able, under the stress of disease, to revert more easily to the fetal methods of blood formation and to exhibit in pathological conditions a less sharp degree of specialization on the part of the marrow and adenoid tissue respectively. It is the combination of a high absolute number of non-granular cells with a relatively low percentage of hæmoglobin which constitutes the hall-mark of the infantile type of blood; and in all conditions of profound anæmia in childhood these characters tend to assert themselves with even greater prominence."

The disorders of the blood he speaks of under the following groups: 1. Congenital abnormalities of the blood. 2. Primary anæmias. 3.

Secondary anæmias. 4. Blood disorders associated with enlargement of the spleen. 5. Leukæmias. 6. Affection of the adenoid tissue.

Under the congenital malformation of the blood he instances cases of (*a*) *infantilism.* One, a girl aged seventeen years, showed polynuclears, 29 per cent.; eosinophiles, 12 per cent.; non-granular cells, 59 per cent. Second, a boy of nine years, also physically and mentally backward, showed polynuclears, 54.8 per cent.; eosinophiles, 3.6 per cent.; non-granular cells, 41.6 per cent. Total leukocytes, 8900. Third case, a girl of nine and a half years, presented the physical characteristics of a child of five years, but there were no signs of cretinism. The mononuclear cells were 60.4 per cent.; polynuclear, 39.6 per cent. Perhaps the tendency to a lymphoid status in these cases may explain the blood picture.

In most cases of cretinism but little that is abnormal has been found. No blood records from cases of mongolism have been reported.

(*b*) *Congenital Anæmias.* Under this head he mentioned four children, all of whom had been very pale from birth. All of them showed more or less signs of rickets, and all showed marked diminution in the number of red cells. There was no distinct leukocytosis, and the differential blood count showed the infantile excess of mononuclear cells. The cases of aplasia of the bone-marrow reported by Ehrlich, Epstein, and others are interesting in this connection.

(*c*) *Primary Anæmias.* He reports two examples of this in which there was marked diminution of the hæmoglobin, both of which improved markedly under treatment with iron. Both of the children showed evidences of rickets. Hutchinson does not believe that the anæmia is secondary to the rickets, but rather that the rickets and the anæmia are both results of insufficient food. The important factor is the small amount of iron. Human milk is very poor in iron, and bad health in the mother may lower this still farther.

Pernicious Anæmia. This must be very rare; from the literature the author was able to collect only 11 cases, only 5 of which he thinks are genuine. "The rarity of pernicious anæmia in childhood is a surprising fact. Recollecting the vulnerability of the blood at this time of life, and the ease with which injurious influences seem to affect it, one would have expected, if pernicious anæmia be really due to the excessive destruction of the blood by a poison, as most authorities seem to think, that it is at this time of life above all others that it would be most apt to occur. If, again, we have to deal in this disease with a resumption of the fetal mode of blood formation with the appearance of megaloblasts in the blood, or, at all events, in the marrow, as Ehrlich teaches, surely it is in the child, who is but so little removed in time from the fetal state, that such a retrograde metamorphosis would be most prone to manifest itself.

Nor are children exempt from those special destructive influences which have sometimes been invoked to explain the disease. Oral sepsis is a frequent and familiar condition in them, and is believed by many to be a common cause of secondary anæmia; the parasitic anæmias also, which may so closely simulate the genuine disease, find striking illustration, even in the earliest years of life.[1] Whatever the explanation of the comparative immunity of young children to pernicious anæmia may be, it is a striking fact in the natural history of the disease which must always be reckoned with in any attempt to account for its etiology."

Secondary Anæmias. The child shows a great tendency to become anæmic when exposed to deleterious influences. The hæmoglobin, as in adults, almost always suffers first. We have then in the red cells a tendency to irregularities and to inequalities in size, and the occurrence of nucleated red cells. In the severe forms, leukocytosis is apt to develop, often as a result of a complicating disease, such as pneumonia, when the leukocytosis is of the polynuclear type. In certain instances, however, secondary anæmia is accompanied by an exaggeration of the normal excess of lymphocytes. The frequency of this, Hutchinson thinks, has been overrated. Leaving out of consideration cases of severe rickets with splenic enlargement it is chiefly anæmias, associated with chronic gastrointestinal disturbances, in which lymphocytosis is apt to occur. If, as has been supposed, the lymphocytes are chiefly concerned in the absorption of food from the intestine, this may be looked upon as an exaggerated digestive leukocytosis.

Special defects in diet which are properly responsible for the anæmia are: 1. Poverty in the amount of iron. 2. Deficiency in proteid. Influences leading to secondary anæmia by causing increased destruction of the blood are most frequently the acutely infective diseases. Rheumatism is especially active in this direction. Particularly when accompanied by pericarditis or endocarditis, the blood cells diminish very rapidly. Diphtheria, also, is attended with severe blood destruction; here there is a tendency for myelocytes to appear in the blood, which is a bad sign. Syphilis, tuberculosis, and chronic diarrhœa are often causes; they increase blood destruction and interfere with blood formation.

Infantile Scurvy. Histological examination of the blood and bone-marrow in this condition has revealed little. Chemical analysis of the blood is difficult as it requires so much blood. It has been stated that the disease is the result of a faulty diet, but whether the fault is a positive or a negative one has not been decided. Some have believed that there was some poisonous constituent (ptomain) in the food, especially tinned food; others have attributed it to some mysterious effect of sterilization. Hutchinson attempted to solve the problem as follows: Children with scurvy were kept on the same diet as that taken when the disease was acquired, and to this diet certain substances were added. By the addition of fruit-juice there was obtained a distinct curative influence which showed that the diet lacked something. He next attempted to administer the individual constituents of the fruit-juice, and it was found that the non-crystallizable or colloid constituents (obtained by dialysis) were without curative effect. The crystalline constituents were found to be curative. The administration, however, of an artificial mixture of the vegetable salts found in fruit-juices was not satisfactory, though it was of some slight beneficial effect.

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[1] See Podwissowky, Jahrbuch f. Kinderheilkunde, Bd. xxix. p. 223; see also case due to tænia, Pediatrics, April 15, 1896.

He thinks the conclusion is provisionally justified that the defect in blood which causes the symptoms of scurvy is a poverty in vegetable salts. It is probable, too, that the citrates are chiefly concerned, three pints of milk containing 50 to 60 grains of citric acid in the form of citrate of lime. It has been shown by Corlette that the calcium citrate of milk occurs in the amorphous and more soluble form. When boiled it becomes changed into the crystallizable form, which is less soluble.

He attributes scurvy to the administration of milk that had been boiled or sterilized as the sole article of diet. Hutchinson found, however, that the administration of calcium citrate was without effect, having less therapeutical power than the artificial salts of potash. The coagulability of the blood is not diminished. According to Wright the alkalinity of blood is diminished, as one would expect, if the vegetable salts of potash were diminished.

BLOOD DISORDERS ASSOCIATED WITH ENLARGEMENT OF THE SPLEEN. While the spleen may be of importance in the carrying on of life, its removal is seemingly without serious consequence. It is apparently established that it acts as a scavenger—removing particulate matters and the disintegrated red and white cells. Enlargement may occur if this function is unusually exercised, but this increase in size is never very great or persistent. It possesses the power of manufacturing lymphocytes as does other adenoid tissue, and this may be of importance in the child. Its duty in this regard is shared by other glands, especially the thymus, and its loss causes no reduction in the number of lymphocytes. These are, in fact, increased when the spleen is removed, and Ehrlich has said that with increase of lymphocytes, and no disease of the lymphatic glands, a functional exclusion of the spleen may be assumed.

SPLENIC ANÆMIA OF INFANCY. Under this heading, Hutchinson includes the group of cases of anæmia with splenic enlargement found in children from six months to two years old. Clinically these cases are as follows: There is wasting, which may be extreme; the skin is sallow, often with a yellowish tint resembling chlorosis; there is almost always rickets, which is usually not marked; there is special tendency to affection of the cranial bones, which often show marked bosses in the frontal and parietal eminences; the liver is enlarged, but not greatly so, and the accessible glands are often palpable, but show no great increase in size; diarrhœa and bronchitis are frequent complications, and death frequently results from bronchopneumonia; epistaxis may occur, but there is no great tendency to hemorrhage; severe cases may show a petechial eruption, which is of bad omen, as few such recover.

In 42 cases congenital syphilis was present in 6, doubtful in 15, excluded in 21. Rickets was marked in 26, slight in 13, and absent in 3; 20 exhibited cranial bossing to a more or less marked degree.

Twins seem to be more liable to this complaint, and he thinks that the disease is more common in Jews, though the statistics are hard to obtain. Tuberculosis is common in the history, but probably no more so than in the usual hospital patient. The children show no greater tendency to tubercle than other children.

The blood examination shows that the red cells are reduced in number, but not greatly—2,000,000 to 3,000,000 being the average; the hæmoglobin is reduced, but not necessarily in proportion to the red cells, and, remembering the physiological lowness of the hæmoglobin, may be but very slightly reduced. Variations in the size of the red cells are common, the large sizes being often seen. Poikilocytosis is usually present, but not to a very great degree. Nucleated red cells are of frequent occurrence, but probably not to any greater extent than in grave secondary anæmias. They exhibit no constant relation to either the number of red cells or the leukocytes. An increase in the number of white cells is common, but not always the case—they may be reduced in number. It is to be remembered that between the ages of twelve and fourteen months the white cells number normally between 12,000 and 14,000. In a few cases the granular cells showed an absolute increase, but in the great majority the increase was due to an augmentation of the non-granular cells. This increase tends to affect chiefly the larger lymphocytes and mononuclears, but all grades are seen, so that differential counting is difficult. Myelocytes are present probably in all cases, if looked for—usually about 2 per cent. The eosinophiles are usually not affected, but in a few cases he has seen a marked increase of the mast cells.

The blood changes are of most importance in prognosis, the size of the spleen being of little value in this respect. The smaller the number of red cells, and the higher the leukocytosis, and the greater the number of myelocytes and large lymphocytes that are present, the more severe the condition.

Pathology. This is very obscure. The author discusses the various cases and reports on 5 autopsies of his own. Generally speaking, the chief change in the spleen in these cases may be spoken of as a chronic splenitis affecting chiefly the pulp, but sometimes invading the Malpighian bodies. There would seem to be no definite relation between the extent of the splenic changes and the degree of anæmia, but the change seems to have gone on to the greatest degree of fibrosis in the cases of longest standing. The fatty degeneration of the liver is comparable to that which one finds in all advanced anæmias, while the condition of the marrow is probably merely compensatory.

In one case, in which glandular changes were found, the condition seemed to be a chronic adenitis comparable to the chronic splenitis already described.

Concerning the nature of the disease, there are four groups of writers who hold four different views. 1. Those who consider that the splenic anæmia of infancy is not a definite disease, but merely a secondary anæmia which owes its peculiar characteristics to the fact that it occurs in the early years of life. Among these writers are mentioned Wentworth, Fischl, Morse, etc. This is the conception of the disease that I have repeatedly given in PROGRESSIVE MEDICINE and elsewhere. 2. Those who regard it as an aleukæmic stage of leukæmia. This belief has been advanced by Luzet and Troje. 3. Those who consider it as standing half-way between leukæmia and pernicious anæmia. This apparently is the opinion of Rotch, Ladd, Engel, and Ewing. 4. Those who consider that the disease is one *sui generis.* This is the idea held by Weiss and Alt, in Germany, and Fowler, Melland, and other English writers. Hutchinson inclines to the latter belief. While he admits that there is no definite relation between the size of the spleen and the blood (meaning evidently the red cells and hæmoglobin), he thinks there is a general ratio between the leukocytosis and the degree of involvement of the spleen, and that these usually vary together. The blood in this condition is distinguished by the polymorphism of the leukocytes from the blood of secondary anæmia. He admits the frequent occurrence of rickets, but insists that the severity of the rickets is by no means proportional to the severity of the anæmia, as the more severe cases may have but slight evidences of rickets and a few cases are reported—3 in his series of 42—in which no rickets was found. This is proof that rickets *per se* cannot cause the disease. The author, therefore, sides with those who would place these cases in a class by themselves for the purpose of clinical classification. He thinks that cases of splenic anæmia of the adult type are occasionally found in children, and mentions a case, reported by Hamill as being of this nature, occurring in a boy aged six years. A nine-year-old boy, reported by Rolleston, also belongs to this type.

Affections of the Adenoid Tissue. The author discusses this subject under three headings: 1. Under generalized *tuberculous adenitis* he describes two such cases with autopsies. In both there was a well-pronounced leukocytosis, chiefly of the polynuclear type. These cases are not common; they exhibit a generalized enlargement of the lymphatic glands, usually some enlargement of the spleen, a pronounced degree of general anæmia, accompanied by more or less polynuclear leukocytosis. The disease tends to occur chiefly in young subjects, runs a comparatively short course, marked by irregular fever, with periodical exacerbations.

2. *Hodgkin's Disease.* This resembles the above clinically, but the author believes is totally different therefrom. Concerning the blood picture there is some doubt. In 10 cases of which he has notes there was a polynuclear leukocytosis in 2; in 1, both the polynuclear and mononuclear forms were somewhat increased. In 5, the polynuclears were diminished; that is, the lymphocytosis was only relative. In 2 cases only was there a slight absolute lymphocytosis. Hutchinson has an idea that there is a tendency to chronic enlargement of the spleen from any cause associated with a relative excess of lymphocytes. Whether the lymphocytosis sometimes seen is found only in those cases where the spleen is markedly enlarged, cannot be said. In none of the reported cases has an examination of the bone-marrow been made. The disease is essentially one of early life, but the period of its maximum frequency is much later than that of tuberculosis.

3. *Lymphosarcoma.* He reports such a case occurring in a boy of nine years, whose blood count, as far as white cells were concerned, remained normal until periosteal growths began to appear. At this time the lymphocytes became considerably increased. This increase in lymphocytes has been noted under similar conditions by other writers. He thinks there is no relationship between the three, and disagrees with the classification advocated by Türck. Nor does he believe that a relationship exists between Hodgkin's disease and leukæmia.

The question of a relationship between lymphatic leukæmia and lymphosarcoma is one not easily settled. The connecting link between the two processes is found in chloroma.

Examination of the Blood. While nothing especially new has been presented during the past year upon this subject, certain modifications of methods generally employed have been published which are worthy of note. These have in view either increased accuracy, reduction in time, or in the number of instruments employed. Onuf[1] gives a solution which permits of the staining and counting of the blood at the same time. The mixture is composed of equal parts of 12 per cent. aqueous solution of formalin, 1 per cent. aqueous solution of NaCl, c. p., 0.5 per cent. aqueous solution of eosin (yellowish), Unna's polychrome methylene blue. The solution will not keep long. Unfortunately, details of the method are not obtainable, but it must be difficult to differentiate the various forms of leukocytes with a $\frac{1}{6}$ lens, the highest power that can be used with the hæmocytometer. Hewes[1] advocates the counting of the white cells from the stained specimen. He makes a count of 200 fields, and from the number of white cells found determines the presence or absence of a leukocytosis. He compared the leukocytic count obtained in this way with that found with the ordinary hæmocytometer, and the results were surprisingly close. In the blood of thirty students he found the number of cells per 100 fields varied between 41 and 90, falling below 50 in only 4 cases, and rising above 85 in 6 cases. The higher counts were always in the afternoon. From these figures a leukocytosis would be suggested if over 90 leukocytes per 100 fields were found at any time in the day; or if over 80 per 100 fields were found in a forenoon count. A finding of 50 leukocytes per 100 fields is equivalent to about 8000 per c.mm. In making a differential count by this method he divides the white cells into (1) basophiles, large nucleated lymphocytes, large mononuclear cells, and transitional cells; (2) neurophile cells; (3) oxyphile cells or eosinophile cells; (4) mast cells. He found the average in his thirty individuals: First variety, 21 to 49 per cent.; second variety, 52 to 78 per cent.; third variety, 0.5 to 6 per cent.; fourth variety, up to 1 per cent.

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[1] American Medicine, April 9, 1904, (Society Report).

Hewes believes that by this method a sufficiently accurate enumeration of the leukocytes is obtainable, while the ease with which the specimens can be obtained from different cases is very evident.

In last year's review attention was called to a method of determining the presence of a leukocytosis by means of guaiac. Klein[2] has investigated this question. Brandenburg had noticed that pus, leukæmic blood, and normal and leukæmic bone-marrow gave the guaiac reaction, while normal blood possessing lymphocytes did not. He was inclined to look upon the reaction as being peculiar to the neutrophile leukocytes. Klein added water to a few drops of blood, then centrifuged the mixture, and collected and dried the residue on white filter-paper. The addition of a drop of tincture of guaiac to this gave a blue color, and this was found to be true in any blood either normal or pathological. The reaction was stronger in proportion as more neutrophile leukocytes were present. He concludes that the difference in reaction between normal and pathological blood on the one side, and mixed-celled leukæmic blood and bone-marrow on the other, is purely a quantitative one.

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[1] Boston Medical and Surgical Journal, December 29, 1904.

[2] Folia Hematologica, 1904, No. 2, vol. i. p. 71.

The larger number of the more recent staining solutions are modifications of the Romanowsky combination of methylene blue and eosin.

The great advantage consists in the ease and rapidity of fixation, together with the facility with which the stain can be made up. Baumgarten[1] gives a résumé of the various modifications which have been advocated since 1891, and the number is surprisingly large. Most of these are supplied in the form of a powder, which can be diluted with alcohol at will to form the stain, or are supplied already prepared by the chemists. Harlow"[2] comments upon the lack of uniformity in these preparations, frequently finding it difficult to get a methyl alcohol which would dissolve the powder of the Jenner, May, Grünwald, or Wright stain so as to give uniform results. He therefore advises the following solutions as being easy of employment, rapid in action, and inexpensive. Solution No. I. Eosin (Grübler's pure French, or an eosin furnished by Bausch & Lomb), 1 gram in absolute methyl alcohol, 100 c.c. Solution No. II. Methylene-blue, 1 gram in absolute methyl alcohol, 100 c.c. The method of employment is as follows:

1. A fresh-spread cover-glass (or slide) taken in the usual manner.
2. Dried in air only.
3. Preparation held in self-closing cover-glass forceps, covered with as much eosin as it will readily hold without draining, allowing same to remain one minute.
4. Eosin rapidly decanted (shake off the surplus). Do not wash the spread in water, and do not allow it to become dry by evaporation.
5. The moist specimen is quickly covered with the methylene-blue solution, allowing to stand about one and one-quarter minutes (different blues require a few seconds more or less than this).
6. Wash gently in ordinary pure water (best to wash or dip spread in a glass of water rather than in a strongly running stream from tap).
7. Dry between layers of filter-paper and mount in balsam.

Enumeration of the Blood Platelets. Comparatively little study has been given to the behavior of the blood platelets in man under the various pathological conditions. Recently, Helber[3] has devised a method for their enumeration, and gives his results in normal and morbid states. His apparatus consists of a counting chamber similar in all particulars to the Zeiss hæmocytometer, except that the chamber is only 0.02 mm. in height. A special pipette is also necessary, made like the usual white blood pipette, but marked at 1 and 31, thus giving a greater dilution. The

[1] American Medicine, January 2, 1904.
[2] American Journal of the Medical Sciences, April, 1904
[3] Deut. Archiv f. klin. Med., Bd. lxxxi. p. 316

diluting solution is a 10 per cent. solution of sodium metaphosphate, which must be made fresh every third day, and always filtered before using. The ear having been cleaned in the ordinary way, is pricked and the blood drawn up to point 1, and then the pipette is filled with diluting solution up to point 31 and well shaken. In satisfactory preparations the fluid in the ampulla of the pipette is bright colored; if otherwise, it must be discarded. Care must be taken not to squeeze the ear when puncturing it. When prepared in this manner, the field shows varied characteristics. The red cells are intact, and show no rouleaux formation. Between the red cells are found small, colorless bodies, about one-third the size of the red cells, of a roundish, oval shape, which refract the light, and show darker spots near the periphery. These are fairly regularly distributed, and are distinguishable from each other. Still larger platelets, about one-half the size of a red cell, are seen, which are probably swollen. Not all of the platelets are round or oval, a portion, especially when some slight injury has occurred, being irregularly notched. The white cells, owing to the smallness of the counting cell, are present in very small numbers. Preparations in which the plaques form distinct heaps of six or eight and the blood cells are agglutinated should not be used for counting purposes.

The Behavior of the Platelets in Healthy Men. In twenty-four healthy men the number of platelets, red and white cells, was determined. No relationship was found between the three. The smallest number was 192,000; the highest was 264,000; the average, 228,000. In two students fasting thirty-six hours, one case showed a diminution of platelets at the end of twenty-four hours, but returned to normal at the end of the thirty-six. In the second case there was an increase in the beginning. The number of red cells diminished in both cases. By very rich diet during thirty-six hours there was a moderate diminution in both cases. The author thinks that the taking of food has probably but little effect on the number of platelets.

Helber examined a number of cases of *anæmia* as to the condition of the plaques. In one case of uterine hemorrhage, in which the red cells were reduced to two and one-half millions, the plaques showed a slight increase. In 4 cases of simple anæmia he found a distinct increase. In severe anæmia and poikilocytosis of moderate grade he found a distinct increase in 3 cases. One of these could not be observed for any length of time, but the other two showed distinct improvement under treatment. In two further cases with marked changes in the red cells the platelets were found to be under the normal. In neither of these was improvement obtainable. The platelets were normal in chlorosis and pseudoleukæmia. In a case of hemorrhagic purpura he compared the number of the platelets with the coagulation time and found there was an apparent relation between the two. On October 19, 1903, when the platelets numbered 40,000, the coagulation time was nine minutes; on October 29th, when the platelets numbered 60,000 to 64,000, coagulation time was seven minutes; November 10th, platelets 180,000, coagulation time four minutes. In mild cases of tuberculosis the number was normal. In five moderately severe cases there was a distinct increase. In three cases of cancer of the stomach the number was increased; and also increased in two cases of contracted kidney with œdema.

In heart disease he found a normal number, as well as in chronic gastric and intestinal disorders, and in hysteria and neurasthenia. In gangrene of the lung, empyema, and post-typhoid spondylitis he found an increase. In chronic disease shortly before death he found a diminution. In croupous pneumonia he found a diminution before and an increase after the crisis. In typhoid there was a diminution during the continuance of the fever, and a marked increase from the beginning of convalescence.

Leukocytes and Leukocytosis. The most important point in the study of the white cells is the differentiation of the several varieties, as there is a general belief that certain special diseases show special leukocytic formulæ. Following the teaching of Ehrlich the leukocytes are divided into classes depending upon the presence or absence of granules, and the staining reaction of these granules—whether they are acid, basic, or neutral. This staining reaction, together with the size, shape, and number of nuclei in the cell, has served to distinguish between the various colorless elements of the blood. Within the past few years the growing use of eosin-methylene-blue stains in varying mixtures and chemical combinations has brought to light the existence of granules in cells hitherto thought to be non-granular, so that differentiation in some cases, by certain stains, has been difficult. Especially is this the case with the so-called azure granules which are claimed to be present in the lymphocytes, hitherto looked upon as the type of non-granular cells. This subject has been treated extensively by numerous writers, among whom may be mentioned Michaelis and Wolf. Wolf[1] brings up the topic anew. He insists that at present it must be admitted that azure granules are as constant an occurrence as other so-called specific granules, and in consequence the distinction between granular and non-granular cells is no longer possible. Distinction can only be made between azure granulation and other varieties of granulation.

He summarizes his beliefs as follows:

1. The division of the leukocytes according to their granulations is to be maintained as the objections urged against this principle are untenable.

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[1] Zeit. klin. Med., Bd. lii. Hefte 3 u. 4.

2. The so-called neutrophile granules may show the most varying shades between blue and reddish-violet in the same blood. The "neutrophile" of the granules is not always the same when different staining methods are employed (for example, with the triacid stain and with the May-Grünwald mixture). These various shades of the neutrophile granules are due to the fact that the granules take up not only the neutral salts, but some of the disassociated coloring material as well.

3. The differentiation of different forms of granulation under neutrophile granules is not to be recommended, as the same process would have to be adopted with eosinophile granules, and the comprehensibility of the whole system would be lost. From the standpoint of utility it is best to maintain the designation "neutrophile" for the special granulation in man.

4. The azure granulations in the lymphocyte and mononuclear leukocytes present a peculiar condition of solubility analogous to mast-cell granulations. This explains the fact that azure granules are not found in all lymphocytes and mononuclear leukocytes, as is the case with specific granulation. The dissolved granules leave often only negative granule forms in the protoplasm of the cells in which they were deposited.

5. The azure granulation of the lymphocyte is to be looked upon as a specific leukocyte granulation, as are the neutrophile and mast-cell granules.

6. There are, therefore, in the blood no non-granular leukocytes; the separation into granulocytes and lymphocytes is no longer tenable.

7. Since the leukocytes are divided according to their granulations, from presence of the same azure granulation in lymphocytes and mononuclear leukocytes, the near relation of these two types of cells is evident.

At this point it may be well to mention the theories advanced by Arneth.[1] These articles are only preliminary extracts from a book upon the neutrophile leukocyte in infectious diseases which has not been accessible to the reviewer. The gist of his theory is to the effect that the important cellular elements from the standpoint of the investigator are the neutrophile leukocytes, which make up the larger proportion of the white cells. Starting out with the statement that the normal numerical variation of the leukocytes is between 5000 and 6000, instead of between 5000 and 10,000, as is generally accepted, he goes on to state that the method of study usually pursued fails to find out the important blood changes that result from disease. He insists that the number of leukocytes is of far less importance than the proportion of the various classes into which he has divided the neutrophile cells. Depending upon the number of the leukocytes, he recognizes:

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[1] Deut. med. Woch., 1904, Nos. 2 and 3; and Münch. med. Woch., 1904, No. 25.

1. Hyperleukocytosis or leukocytosis, which may be (*a*) isohypercytosis or (*b*) anisohypercytosis.

2. Normoleukocytosis or normocytosis, which may be (*a*) isonormocytosis or (*b*) anisonormocytosis.

3. Hypoleukocytosis or hypocytosis, which may be (*a*) isohypocytosis or (*b*) anisohypocytosis.

The neutrophiles themselves are divided into five classes depending upon the shape and number of the neuclei.

Class 1 has only one nucleus. If this is completely round it is called a myelocyte (*M*); if slightly (*wenig*) it is classed as *W;* if deeply (*tief*) indented it is classed as *T*.

Class 2 has two nuclei or portions of nuclei. There may be distinct round nuclei (*kern*), which he abbreviates as *K*, or loop (*schlingen*) abbreviated as *S*. Under this class there are three divisions—viz., (*a*) 2 K; (*b*) 2 S; 1 K 1 S.

Class 3. This is composed of neutrophiles with three nuclei or three nuclear particles, and has four divisions. (*a*) 3 K; (*b*) 3 S; 2 K 1 S; 2 S 1 K.

Class 4. Composed of neutrophiles with four nuclear particles, and has five divisions (*a*) 4 K; (*b*) 4 S; 2 K 2 S; 3 K 1 S; 3 S 1 K.

Class 5. Composed of neutrophiles with five or more nuclear particles. These are, of course, counted with an oil immersion, and one hundred neutrophiles are enumerated and set down in columns corresponding to the arrangement of the nuclei. Under the influence of disease the effect first noted is a disappearance of the divisions containing the largest number of nuclear particles, the fifth class disappearing first, then the fourth, and finally the third. Arneth has never seen disappearance of the second and first classes.

The field of study opened up by these investigations is an interesting one, but the amount of information at hand is too small to justify opinion. From the preliminary reports there is an apparent neglect of study of the remaining leukocytes, which is certainly not justifiable in the light of our present knowledge, but this may not be evident in the monograph.

EXPERIMENTAL LEUKOCYTOSIS. There have been many theories advanced to explain the phenomena of increased white cells in the peripheral blood, but none of them are entirely free from objection. Studies along this line are therefore of importance. Silverman[1] has conducted a series of experiments upon dogs, with a view of determining the effects produced upon the blood of these animals by the intravenous injection of putrid horse serum; what relation existed between body temperature and leukocytes; and how changes in the walls of the bloodvessels affected the latter. The theories of leukocytosis are: The chemotactic theory, which considers the excess of white cells to be the result of the strong attraction exerted upon the large store of leukocytes, all present in the bone-marrow, by toxins or micro-organisms. The conception does not take into account any actual increase in the leukocytes—only a difference in distribution. Römer accepts the idea of chemotaxis in leukocytosis, but believes that a multiplication occurs by amitosis in the blood current. Limbeck having found an inflammatory leukocytosis only when associated with a purulent exudate at the point of inoculation, attributed the increase to the local exudate. Löwit looks upon leukocytosis as a process of regeneration. Silverman first determined the actual and relative number of leukocytes in a number of dogs kept under the same conditions, and found that wide variations occurred in different dogs, and in the same dog during different periods of the day. His injections of the putrid horse serum varied in amount from 18 drops to 3.5 c.c., and were made into the jugular vein. The cells were counted and stained in the usual way. With a view to determining the cause of the initial hypoleukocytosis he tried the effect of dilatation of the vasomotor system by means of the nitrites. The results of his investigations are given briefly and clearly in his conclusions, which are appended.

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[1] University of Pennsylvania Medical Bulletin, March, 1904.

1. The injection of putrid horse serum causes a primary hypoleukocytosis, in which the polymorphonuclear neutrophiles are diminished and the mononuclear elements increased, followed by a secondary hyperleukocytosis, which is characterized by (*a*) a great increase in the polymorphonuclear variety; (*b*) an appearance of cells on the border-line of myelocytes, as well as an actual presence, in the severe cases of leukocytosis, of mononuclear neutrophiles in small numbers; (*c*) a deficiency of hæmoglobin which was found in 60 per cent. of the dogs experimented upon, associated with an appearance of normoblasts in the blood.

2. There is no definite relation between the leukocytosis and the rise of temperature; the grade of the leukocytosis is not proportionate to the height of the temperature, and the maximum rise in one occurs independently of that of the other.

3. Inhalations of amyl nitrite and injections of potassium nitrite cause a primary hyperleukocytosis in a very short time, due probably to the dilatation of the capillaries.

4. Potassium nitrite administered before the injection of peptone lessens the duration and the extent of the disappearance in the number of the leukocytes during hypoleukocytosis, and thus disproves that the leukocytes are destroyed, as Löwit supposes.

5. The results of the foregoing experiments lead to the belief that the decrease in the number of the leukocytes in the beginning of leukocytosis

is due to their obstruction and imprisonment, caused by the narrowing in the lumen of the capillaries, owing to the irritation of the endothelium by foreign toxic substances.

Leukocytosis from Drugs. Somewhat along the same line are the investigations of French,[1] made upon himself with some of the drugs which are said to produce an increase in the number of leukocytes in the blood. He first determined the normal variation in his own leukocytes, which were found to range between 5000 and 13,000 per c.mm., which is rather high according to modern views. Nuclein by the mouth and hypodermically caused no change, nor did injections of sodium cinnamate. Injections of collargol were followed by leukocytosis, but the accompanying symptoms were such as to make him think it of doubtful value in a patient already ill. After injection of 30 mg. there was no change in the white-cell count for ten hours; twelve hours after injection the number was 14,375; twenty-four hours after, 16,250; and reached a maximum of 32,187 thirty hours after injection, and then rapidly fell to normal. Twenty-four hours after injection he began to feel pain in the back and limbs, and headache, but without loss of appetite. The temperature rose to 99° thirty hours after injection, and reached 101° at the fortieth hour, returning to the normal after sixty hours. The headache persisted for four days.

Leukocytosis in Pregnancy and the Puerperium. A knowledge of the behavior of the leukocytes during the latter month of pregnancy and in the puerperium is of great importance. At this time the liability to infection is increased and the diagnosis as to whether pus is present or not is often hard to make. To know the value of leukocytosis present in a given case it is necessary to understand the condition of the white cells normally. Lobenstine[2] reports some investigations upon this subject. In 50 cases examined during the ninth month of pregnancy the average number of leukocytes was 10,600, the lowest count being 5400 and the highest 18,400. The average was 11,854 in primiparæ and 9346 in multiparæ; leukocytosis was absent in nine cases. In these patients the effect of digestion on the leukocytes was also noted, and it was found that a digestive leukocytosis appeared in thirteen cases; no change in one case; an actual decrease took place in six.

Counts were made on fifty healthy patients on the third day of the puerperium, the local discharge and the temperature being normal in each instance. The average count was 12,400; highest, 20,400; lowest, 5600. Average in primiparæ, 13,200; in multiparæ, 11,600; absent leukocytosis in eight cases.

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[1] Medical Press and Circular, May 11, 1904; Lancet, April 30, 1904.

[2] American Journal of the Medical Sciences, vol. cxxviii. p. 281.

From the above it is evident that in the latter months of pregnancy and the puerperium there is a slight tendency to leukocyte increase, which is more marked in primiparæ. Lobenstine thinks this increase is due to a natural augmentation of the metabolic processes.

The occurrence of a leukocytosis in the latter months of pregnancy has come to be looked upon as normal, and the investigations of Zangemeister and Wagner and of Pray, Senger, and others[1] have all confirmed this belief. As can readily be understood, this physiological increase of the white cells tends to nullify the finding of a leukocytosis as a sign of a complication in the latter months of pregnancy unless the leukocytosis be beyond 20,000. Pankow,[2] however, maintains that leukocytosis in the latter months of pregnancy is unusual, though he agrees with the other observers that there is a leukocyte increase during labor, which gradually disappears, the count coming to the normal about the fourth or fifth day.

In pregnancy, as in other conditions, the normal numerical value of the white cells is by no means well settled. While most modern observers believe that the normal count is always under 10,000, the investigations of Hewes and French[3] are rather at varience with this opinion. Hewes found in thirty healthy young men that the number of white cells varied between 6200 in the morning and 14,800 in the afternoon, while French, in experimenting upon himself, found variations between 5000 and 13,000. In spite of this a continued study of the changes in the white cells under normal and pathological conditions may serve to bring some new things to light.

The results of studies made during certain complications of labor are less contradictory than those on the normal. Thus, Lobenstine[4] in his study of 10 cases of *eclampsia* found that the leukocytes were increased as a result, he thinks, of the toxin present. He notes that there seems to be a relationship between the degree of the toxicity and the number of leukocytes, and that this increase of white cells is an index of the resisting power. He also states that a sudden increase in the leukocytes usually indicates an increase in the severity of the condition. Carmichael[5] comments on the fact that in eclampsia an increase in the leukocytes is often accompanied by a diminution in the severity of the disease. Both agree that the leukocytes are increased. The theory of retention of the toxins as being the cause of the increase of leukocytes in Lobenstine's cases may be true, and seems plausible. But it must be remembered that some observers—notably Zangemeister and Wagner—insist that the mechanical processes of labor are of paramount importance in the leukocyte increase. Thus they found that the leukocytes were higher when the labor was prolonged, as from a narrow pelvis, and that instrumental interference, as the introduction of a colpeurynter, caused a higher count. In practically all of Lobenstine's cases an *accouchement forcé* was performed, and this, together with the prolonged strain of repeated convulsions, ought to have much the same effect as the muscular efforts in the expulsion of the fœtus. Dutzmann[1] is of the opinion that eclampsia is a true infection because of the behavior of the leukocytes.

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[1] Progressive Medicine, June, 1903.

[2] Centralbl. f. Gynäkologie, 1904, No. 11.

[3] Loc. cit.

[4] Loc. cit.

[5] British Medical Journal, December 5, 1903.

LEUKOCYTOSIS IN APPENDICITIS AND GYNECOLOGICAL CONDITIONS. These are spoken of together as in both instances there is usually an involvement of the peritoneum of greater or less extent. There is a very great difference of opinion as to the value of the leukocyte count in the pelvic inflammations which come under the care of the gynecologist. Pankow[2] is the most enthusiastic believer in the diagnostic value of the leukocyte count. According to his idea, in all cases in which there is a persistent count of over 10,000 the presence of pus in the pelvis should be assumed unless other explanation for this count be at hand. Pus cannot be excluded even when there is no leukocytosis, as the abscess may be well encapsulated. In this latter opinion Kirchmayer[3] agrees, but is much more conservative in his other statements. Thus he states that a leukocytosis of 30,000 points with great probability to the presence of pus, while a moderate increase in the white cells is of but little diagnostic value. Dutzmann[4] is convinced of the value of leukocytosis as an aid to the diagnosis of inflammations of the adnexa, and suggests that in doubtful cases the glycogen reaction may be of great value in determining the presence of pus. Both Pankow and Dutzmann comment on the fact that torsion of the pedicle of an ovarian cyst may cause leukocyte increase without the presence of pus. Pankow thinks this may be due to peritoneal irritation.

Concerning the value of leukocytosis in appendicitis numerous articles have been published. Among these may be mentioned those of Head,[5] Federmann,[6] French,[7] Jamieson and Stacy,[8] Sprengel.[9] The consensus of opinion points to the belief that in appendicitis the leukocyte count is of importance both in prognosis and diagnosis, but should always be looked upon as one of the important symptoms. According to Federmann, each case has a typical leukocyte curve, which varies according to the severity of the disease. Usually in the first two days the count is below 20,000 in the simple cases, being higher in more grave cases. Marked symptoms with a low count indicate in this stage severe intoxication, and is an unfavorable sign. A high count on the third to fifth day indicates pus without tendency to encapsulation, and hence operation is necessary. A falling count with increased severity of the symptoms is a bad sign. A count of over 20,000 after the first week shows an encapsulated abscess. Head points out that the leukocyte count is valuable in determining whether the appendicitis is catarrhal or suppurative, and in the majority of cases indicates this distinction. It also shows whether or not the disease is spreading, and is of great aid in helping to differentiate appendicitis from other conditions which give somewhat similar symptoms, as calculus, gallstones, typhoid fever with appendicular symptoms, etc. French calls attention to the great variability of the counts, and thinks too much stress may be laid upon this symptom in deciding as to operation. From his own 83 cases and a number collected from the literature he finds that the lowest number of cells which has always indicated pus is 32,000. This is considerably higher than the figure given by Da Costa and others as being indicative of suppuration in appendicitis. French takes as a criterion cases with a high leukocyte count which have subsided without operation, and notes that many with a count of 20,000 have subsided spontaneously, while others with a count of 15,000 have been shown to have pus. This observer is inclined to lay more stress upon the so-called "rising count" than upon the total number.

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[1] Monatsschrift f. Geb. u. Gyn., Bd. xviii. Heft 1.

[2] Centralbl. f. Gynäkologie, 1904, No. 11.

[3] Wien. klin. Rundschau, 1903, No. 11.

[4] Loc. cit.

[5] Northwestern Lancet, February 15, 1904.

[6] Mitth. a. d. Grenzgeb. d. Med. u. Chirug., Bd. xviii. Heft 2.

[7] The Practitioner, June, 1904.

[8] Australasian Medical Gazette.

[9] Münch. med. Woch., 1904, No. 37.

The entire subject of surgical leukocytosis is well reviewed by Julliard,[1] and in the main agrees with the findings above given. He claims that *suppuration in the liver* gives a higher leukocyte count than abscess in any other part of the organism, often reaching between 45,000 and 90,000. In cancer of the stomach he lays stress upon the absence of a digestive leukocytosis in the differentiation between this condition and gastric ulcer. It is proper to recall that this failure of post-digestive leukocytosis in gastric carcinoma has been thought to be due simply to pyloric obstruction, and it was found that even in cancer, if the pylorus was unobstructed, the post-digestive increase could be noted, while in other conditions causing obstruction no post-digestive increase took place. Realizing what a small part is played by the stomach in absorption and assimilation of food, it would seem very plausible that the increase of leukocytes would occur when the food reached the small intestine. At all events, comparatively little attention has been given to the leukocytosis of digestion, except to realize the bearing it may have upon counts made for diagnostic purposes.

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[1] Revue de chirurgie, vol. xxiv. Nos. 5, 6, 7, 8.

Leukocytosis in Surgical Affections. Several publications dealing with this topic have appeared. That of Julliard[1] has already been referred to. Tuffier[2] emphasizes the importance of blood examination in surgery. He finds in *cancer of the stomach* that there is a leukocytosis of 10,000 to 15,000 affecting chiefly the polynuclear cells. These findings are not invariable, a point which is also emphasized by Kurpjuweit.[3] Tuffier finds that hyperleukocytosis occurs earlier, is more constant, and is generally higher in sarcoma than in cancer. He also finds in liver abscesses pronounced hyperleukocytosis with marked polynuclear increase and no eosinophilia, while in hydatid cyst the leukocytosis is not well marked (10,000 to 12,000), and there is a distinct increase in the eosinophile cells. The behavior of the mononuclear cells in gastric carcinoma has been studied earlier by Strauss and Rohnstein, who found that they had a tendency to be low in contradistinction to pernicious anæmia, where the mononuclears are high. This finding had been verified by Kurpjuweit, but he reports one peculiar case of gastric carcinoma in which immediately before death the mononuclear leukocytes amounted to 33 per cent.; the lymphocytes 32 per cent., and the polynuclear cells 35 per cent. The autopsy showed nothing to account for this change in the blood picture, and the author explains the occurrence on the ground that a large portion of the tumor broke down suddenly, with a rapid formation of toxins and coincident effect on the leukocyte formula.

DIABETES MELLITUS.

Etiology of Diabetes. During the past few years there has been a gradually increasing belief in the theory that the pancreas is chiefly at fault in diabetes mellitus. The work of Opie, confirmed by Weichselbaum and Stangl and others, has shown that in a considerable number of the cases coming to autopsy changes are found in the islands of Langerhans leading to their complete destruction. In one very acute case there was found a hyaline transformation of these bodies. The pathological changes of the pancreas in diabetes mellitus are discussed by Pearce[4] in a symposium on diabetes. In five of the six cases he reported upon changes in Langerhans' islands could be detected—four being of the intracinar type of pancreatitis, with involvement of the islands, and one showing the hyaline transformation above referred to. The sixth case was normal as far as the pancreas was concerned. Not only is diabetes caused by primary disease of the pancreas but secondary changes which act upon the islands to their detriment are also productive of diabetes. Thus in thirty cases of cancer of the pancreas studied by Pearce, glycosuria was present in three—one being true diabetes, another intermittent glycosuria, and in the third there was no data as to the glycosuria other than its presence. In the first, intracinar pancreatitis with involvement of the islands was found; in the second the pancreas was apparently normal in the involved portion; in the third there was not sufficient amount of the organ for study. While stating that he does not advocate the origin of all cases of diabetes from the pancreas, Pearce asserts that there is a definite basis for ascribing a certain number of cases of diabetes to pancreatic lesions. In the case above mentioned where the pancreas was found to be normal he suggests the possibility of a functional deficiency of the islands. This brings up the subject of the functions which are carried on by the islands, and inasmuch as they have no outlet by way of a duct, this function is thought to be the production of a secretion which is given directly to the blood—an internal secretion.

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[1] Loc. cit.

[2] Presse médicale, 1904, No. 89.

[3] Deut. med. Wochen., May 21, 1903.

[4] Albany Medical Annals, April, 1904.

Pearce has found that the islands are separated from the primary acini of the pancreas at an early age in their development and become anatomically independent, having a blood supply proportionally in excess of that of the acinus. He believes this anatomical differentiation is an argument in favor of a special function on the part of the islands. As to cases of diabetes mellitus apparently dependent upon changes in organs other than the pancreas, he mentions forms of glycosuria associated with acromegaly, with cirrhosis of the liver, with arteriosclerosis, and especially the diabetes of hæmochromatosis as appearing, in the light of recent investigations, to have a relation to disease of the pancreas. In the acromegalic diabetes he quotes the suggestion of Opie that the induration characteristic of the disease may occur in the pancreas as well as in other parts, and when sufficiently advanced produce diabetes. In arteriosclerosis the changes may affect the nutrition of the pancreas. In cirrhosis of the liver there may be a coincident chronic pancreatitis from the same cause. In the *bronze diabetes* Opie has found the intracinar type of pancreatitis in one case seen by him. Diabetes from nervous lesions have been explained by Naunyn on the ground that through the secretory or nutritive nerves we have a disturbance of function in the organ presiding over the carbohydrate mechanism. The diabetes resulting from the administration of phloridzin is due to injury of the renal epithelium, while that in exophthalmic goitre is unexplained; but Opie has noted that no study of the pancreas has been made in the cases of diabetes in Basedow's disease.

The opinions of Pearce are the ones now generally held—viz., that diabetes is more frequently due to disease of the pancreas, and particularly the islands of Langerhans, than has been generally believed, but may also be the result of lesions in other organs. But there are those who object to this theory of the casual relation of the islands to diabetes, among whom may be mentioned Schmidt, whose views have been given in a previous number of PROGRESSIVE MEDICINE. One of the great difficulties in the solution of the problem is the proper classification of glycosuria. The occurrence of substances in the urine capable of reducing Fehling's solution is not uncommon in many conditions, and even when this is proven to be glucose the symptom may be transitory, or, if constant, the general condition of health may be unimpaired for a long period of time. This variety of glycosuria shows no special difference from that found in so-called "true" diabetes, which generally terminates in death in a comparatively short time. De Renzi[1] believes there are two distinct types of diabetes. The smaller number belong to the type in which the pancreas or some other organ is diseased, and in these the organic changes have so progressed before the diabetes is diagnosticated that cure is out of the question. The second and larger variety of diabetes belongs to the same class of diseases as does gout. We have here to do with a condition of delayed or slow metabolism—*bradytrophism*, also known as arthritism. This state of the body may be congenital or acquired, the latter being the result of overeating, especially of the carbohydrates; the former is due to dietetic errors on the part of the parents. The children of such parents inherit a limited range of organic activity, and they are less able than their fellows to endure errors in diet. The metabolic activity may be so lessened that there is difficulty in handling the usual food, and excesses so slight as to be within the normal range of the average individual of the same age and size may lead to glycosuria. This theory of inherited inability to metabolize carbohydrates has already been advanced by Lorand.

As the prominent symptom of diabetes is the excretion of sugar in the urine much attention has been given to the study of carbohydrates metabolism by those interested in diabetes. This phase of the subject has been discussed by Edsall.[2] In his review of the subject he takes up the subject of glycolytic ferments, the investigation of which has been so active in recent years. Lepine some years ago stated that he had proved the presence of glycolitic ferment in the blood, which is normally furnished by the pancreas, and is absent or reduced in diabetes. Later on this view was denied and in the main given up by Lepine himself, and at present he tends to the belief that while normally sugar circulates in a combination which cannot pass the kidneys, in pancreatic diabetes this combining substance is insufficient, and the sugar which is free in the blood can readily pass the renal epithelium. It has been thought that the pancreas and other tissues produce a glycotic ferment which when distributed would permit the occurrence of glycosuria. The great objections to the investigations published is the uncertainty as to the proof of the presence of a ferment. Bacteria when present can cause oxidation, and it has been shown by De Brun that sugars may undergo stereochemical changes in even weak alkaline solutions, and thus create error as to the amount of sugar in these solutions. Other observers have published experiments to show that juices from various organs possess glycolytic power, as muscle and liver as well as the pancreas. Still later it has been shown by Cohnheim that the juice of muscle or pancreas alone possessed no glycolytic action, but when combined a very distinct sugar-destroying power was developed. This finding brings up the probability of there being an inactive ferment in the muscle which is rendered active by the presence of the pancreatic substance on the theory of Ehrlich of a complement and intermediary body. Edsall sums up his discussion as follows: "The pancreas possesses an extremely important influence on carbohydrate metabolism, and it is not known in what way this organ exerts its influence, except that it probably does not do so merely through providing a glycolytic ferment, but possibly through influencing the glycolytic activities of other tissues. Finally, it is becoming increasingly evident that carbohydrate metabolism is intimately associated not only with the pancreas, but also with other tissues, and it is constantly assuming greater complexity than it has generally been conceived of as exhibiting. At present one is justified in suspecting, at least, that carbohydrate metabolism is of a complexity that is comparable with that of proteid metabolism."

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[1] Berlin klin. Woch., Nov., 1904.

[2] Albany Medical Annals, April, 1904.

The investigations upon the fate of carbohydrates in the human organism have been of extreme interest and have led to the recognition of certain facts of importance in prognosis and treatment. Mandel and Lusk[1] believe that the relation of the amount of dextrose to that of nitrogen excreted in the urine is of distinct diagnostic value. In absolute diabetes in dogs (after phloridzin injections) this ratio of D: N was found to be 3.65 : 1. If this proportion is found in man on a simple fat meat diet it indicates complete intolerance for sugar and is of bad omen. With a less proportion improvement is always possible. These writers believe that the presence of acetone and diacetic and oxybutyric acids in the urine need not always be alarming, as patients have been known to improve considerably after excreting 5 to 6 gm. of acetone and 40 gm. of oxybutyric acid in the twenty-four hours. Also, they believe that there is no reason to think that the fats participate in the production of sugar even when the D : N ratio is higher than 3.65 : 1. It is probable in such an event that the sugar is derived from proteid taken the day before, since the nitrogen is always more rapidly excreted. From patients fed upon oatmeal 85 per cent. of the starch was recovered from sugar, and from those fed on levulose 80 per cent. appeared as sugar. In depancreatized dogs the D : N ratio never equals more than 2.8 : 1, and it is thought that after phloridzin injections a compound of dextrose and proteid is decomposed which is normally burnt up in animals showing the 2.8 : 1 ratio.

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[1] Deut. Archiv f. klin. Med., Bd. lxxxi. No. 596.

The work of Beddard and Spriggs[1] upon the metabolism in severe diabetes is important in pointing out the conditions obtaining under dietary regulations in advanced cases. Bad effects such as nausea, vomiting, weakness, and loss of weight with the odor of acetone on the breath which follows a too rapid withdrawal of carbohydrates from the food of a severe diabetic are associated with precisely the same metabolic changes and symptoms of acid poisoning as in coma itself, to which they are known to sometimes lead. The most important result in the urine is a rapid rise in the proportion of ammonia. The percentage of nitrogen excreted in this form rose in one case in ten days from 7 per cent. to 29 per cent.; the alkalinity of the blood also falls and the amount of CO_2 in it is diminished. The peccant material, therefore, does not seem to be derived from carbohydrates.

The spontaneous recovery which usually occurs is accompanied by a diuresis, but not by a fall in the proportion of ammonia. The administration of an alkali produces an opposite effect to a diabetic diet, as regards the ammonia, and causes a general improvement in the condition of the patient and a disappearance of the odor of acetone. Although an increase in the quantity of urine follows, there is no marked rise in the excretion of the sugar after the first day or two. The alkali was given in milk up to 75 gm. daily of sodium bicarbonate in four equal portions. It would seem advisable to use this drug when a patient is to be transferred from an ordinary diet to an antidiabetic. The administration of the alkali must be watched as a disturbance of digestion, diarrhœa, or œdema may be produced; the object of the alkali is obtained when the urine becomes neutral; this may be in a few days or not for some weeks. Opium caused a diminution in the amount of urine and its constituents, but none in the proportion of ammonia. Codeine had no effect on metabolism. Ferric chloride reaction was most marked on a diabetic diet and is diminished by alkali. This sign and the weight of the patient were found to be better guides to the condition of severe cases than was the amount of sugar in the urine.

Classification of Diabetes. As has previously been mentioned there is great practical difficulty in defining the precise signs and symptoms upon which a diagnosis of diabetes mellitus may be made. Of late some attention has been given to an attempted distinction between glycosuria and diabetes mellitus, but the basis of classification offered is not entirely satisfactory. Thomson[1] states that a glycosuria existing for a year or more justifies the name of diabetes mellitus. This, however, leaves much to be desired, and the designation of cases as being "true diabetes" or as glycosuria without sharp lines of difference is scarcely scientific. We find cases recorded as transitory diabetes in which the glycosuria exists for only a short time. Thus Mann[2] describes a case in a man aged forty-five years who had diabetes insipidus which within a few weeks became converted into diabetes mellitus. The excretion of sugar lasted but sixteen days under an oatmeal diet. Later on the patient died of gastric carcinoma with pancreatic involvement. Such case reports as these are misleading.

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[1] British Medical Journal, September 24, 1904.

Complications of Diabetes. Certain reports of unusual conditions occurring in diabetes are worthy of comment. Teschemacher[3] calls attention to the frequency with which *Dupuytren's contraction* may be found in diabetics between the ages of fifty and seventy. He found 33 cases of contracture in 213 diabetics examined. Only 3 of these were in women, and in only 1 case was the occupation of a kind to expose the hand to repeated injury. He attributes the condition to some toxin acting upon the nervous system. Heidenheim[4] reports the occurrence of a well-marked case of *scurvy* in a man aged sixty-seven years who had previously been well. There was nose-bleed; swollen, bleeding, and painful gums; anorexia, and bad taste in the mouth. His urine was found to contain 6.5 per cent. of sugar. The mouth condition failing to respond to ordinary remedies *formalin* (two teaspoonfuls to a wineglass of water) was used hourly as a mouth-wash. The local effect was prompt, the general condition improved rapidly, and the sugar disappeared. Four months later there was again an attack of *fetor ex ore* and anorexia with glycosuria, but no hemorrhage, but this disappeared promptly on resumption of the formalin. Futcher[5] comments upon the infrequency of *lobar pneumonia* in diabetes. It occurred in only 3 out of 134 cases of diabetes; all three died.

Treatment. DIET. The treatment of diabetes mellitus is a favorite topic for discussion and numerous articles are published each year. In one thing all are agreed—viz., that the diet must be regulated and this regulation is usually in the direction of limitation of the carbohydrate intake. Knowledge gained from both clinical and chemical investigation has fully demonstrated that the choice of diet must be made carefully with due consideration to the patient and his general condition. In other words, the important thing is to treat the patient, inasmuch as a diet devoid of carbohydrates cannot be kept up for any length of time.

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[1] Boston Medical and Surgical Journal, November 14, 1904.

[2] Berlin. klin. Woch., July 25, 1904.

[3] Deut. med. Woch., March 31, 1904.

[4] Ibid., May 26, 1904.

[5] Medical News, February 27, 1905 (Society Report).

The aim of treatment in diabetes is first to bring about the disappearance of glycosuria and then train the system to again handle a starchy diet. In other words we seek to re-establish a tolerance for the carbohydrate food. Up to the present time the best recognized method of causing disappearance of glycosuria is the interdiction of starchy food, but whether this is done suddenly or gradually must depend upon the individual case. As has already been pointed out, the too sudden removal of starch in bad cases may be productive of very grave symptoms, even coma. Williamson[1] divided his cases into three classes—mild, in which the urine can be made sugar-free by a rigid diet; those of medium severity, in which diet fails to cause a complete disappearance of sugar; the most severe form, in which the perchloride of iron reaction is present in the urine. In treatment it is of importance to know of the form of the disease, and the condition of the lungs, heart, and kidneys should be investigated. The weight should be taken periodically, and the urine and its contents in sugar recorded at least weekly. In Class I. rigid diet should be instituted, and carbohydrates should be given gradually. If the patient loses weight, or refuses to continue the diet, we must content ourselves with moderate restriction of carbohydrates, keeping the sugar excretion down to 500 grains. In Class II. a strict diet may be tried, but if the patient loses weight a small amount of bread should be given. In Class III. rigid diet is often injurious, and a small amount of bread should be allowed. As a substitute for bread Williamson prepares protein bread, casoid bread, casoid meal bread, and aleuronat and cocoanut biscuits. As a formula for making protein bread he gives: four ounces of No. 2 protein, two ounces of butter, and two eggs. Beat all together thoroughly. Divide so as to form eight small cobs and bake in oven. This is practically free from starch and often has a marked effect in reducing sugar. This may be alternated with, or combined with, or substituted by, casoid bread or casoid meal bread. The aleuronat and cocoanut cakes are made as follows: two ounces of dried cocoanut powder are mixed into a paste with a little water containing a small quantity of German yeast. This is kept for half an hour in a warm place. The fermentation decomposes the sugar and the paste becomes spongy. To this are added two ounces of aleuronat, one egg beaten, a small quantity of water, a little saccharin or saxin, and the whole mixed to form a paste. This is baked for twenty or thirty minutes. Milk free from sugar he makes as follows: four tablespoonfuls of cream and a pint of water are well mixed and allowed to stand in a cool place for twelve hours. The fat is skimmed from the surface of the water, placed in another vessel, and water, the white of an egg, and a little salt are added. The milk-sugar remains in the water dissolved, while the fat rises to the top.

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[1] Lancet, January 23, 1904.

The plan adopted by Williamson is perhaps that of the majority of observers. Oefele[1] makes objections to the usual method of withdrawing the carbohydrate from the food and increasing the fat and albumin on the ground that in many cases the body is unable to assimilate the excessive amounts of fat and albumin, as is seen by the examination of the feces. The diabetic body, Oefele says, is unable to store up sugar, and accordingly advises the administration of sugar-forming substances in easily digestible form at a time outside of the chief meals. Substances rich in cellulose and albumin or food prepared with albumin (milk) are to be omitted. Between meals he gives beet-sugar dissolved in water before and at the beginning of muscular exercise. He believes that when given in this manner the sugar can be used as a source of energy. During the past few years several publications have extolled the merits of potatoes as a diet in diabetes. Sawyer[2] recommends a bread made of bran and potatoes with their jackets on. They are then peeled and squeezed into flour with the fingers; half-pound of this flour is mixed with one-quarter pound of bran, half an ounce of German yeast, and half an ounce of butter, and one egg. After mixing the paste is allowed to stand by the fire for an hour to rise and baked in greased tins for an hour and a half. He allows potatoes to his diabetic patients and believes that the good obtained arises from the content in potash and phosphoric acid. To retain these the only proper way of cooking is by steaming with the jackets on. In other methods some of the above-mentioned ingredients are lost.

Diets of potatoes, oatmeal, etc., were fully discussed last year and attention called to the fact that the patient must be carefully studied in order to find out the special form of carbohydrate he is best able to metabolize. Recently, Stern[3] has advocated a diet of the yolks of eggs, of which he gives ten to forty daily, combined occasionally with a small amount of proteid and unavoidable carbohydrate, as in green vegetables. The rationale of the yolk cure he sums up as follows: 1. Palmitin, stearin, and olein the fat substances of the yolk occasion only small amounts of acetone bodies, and, in combination in which they exist in the yolk, yield little or no butyric acid. 2. The large amount of lecithin supplied to the organism by the yolk tends to the restoration of the nerve forces and the amelioration of the cachectic condition. 3. There occurs in the yolk a diastatic ferment which assists in the conversion of amyloid substances introduced by the proteids and allowed vegetables. 4. A function of the yolk is stimulating the digestive secretions.

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[1] Deut. Aerzte-Zeitung, 1902-3.

[2] British Medical Journal, March 5, 1904.

[3] Medical News, October 22, 1904 (Society Report).

When we come to a consideration of the *drugs* advocated for the treatment of diabetes the number is many. As a rule the published cases of successful treatment with some drug or method are followed by several other publications of cases in which the lauded treatment has proved unsatisfactory. A very complete résumé of the modern methods of treatment in diabetes is given by Strauss.[1] Most of these have already been considered in former numbers of PROGRESSIVE MEDICINE. A few contributions are of interest as they deal with the scientific investigation of preparations which are secret or patented. In diabetes as in all chronic diseases the opportunities for deceiving the unfortunate patient are very great. The distaste for the rigid diet laid down in orthodox treatment makes the diabetic only too anxious to try any remedy which promises relief without so much discomfort on his part. These remedies should be carefully investigated by unbiased observers and the reports published. Studzinski[2] gives his results in 3 cases treated with "*Essentia antimellini composita.*" This is a patented mixture, the active agent in which is said to be jambul. All of Studzinski's patients were young and all had idiopathic diabetes. Careful trial of the compound failed to reveal any change that could be attributed to the use of the medicine. The treatment is very expensive. Lenne[3] also calls attention to bad results obtained with this compound.

Dapper[4] has described the results in 4 cases of diabetes mellitus treated with a patented preparation called "Djoeat." This, too, claims jambul as its active constituent, combined with numerous other drugs. The directions as given on the remedy insist upon the carrying out of a rigid diet. Dapper tried first the effects of diet alone and then gave the "Djoeat" to see if any additional effect was produced. In all four cases the result was unfavorable and in some instances the compound seemed rather to increase the sugar and acetone excretion. When *jambul* is used Dapper recommends the formula of von Noorden. He advises that the drug be bought of Merck in order to ensure its freshness, as old material is inactive. Two hundred grams of the fruit are finely chopped and to it is added 10 gm. sodium chloride, 4 gm. salicylic acid, and 2 litres of water. The mixture is allowed to macerate for twenty-four hours at blood temperature. The dose is 100 c.c. morning and night.

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[1] Deut. med. Woch., 1904, Nos. 45, 46, and 47.

[2] Ibid., Nos. 24–25.

[3] Therapeut. Monatsheft., October, 1903.

[4] Deut. med. Woch., 1904, No. 32.

Among other drugs mentioned are *potassium iodide,* which is warmly advocated by Galloway.[1] He gives the salt in doses of 10 to 15 grains every three or four hours until the specific gravity of the urine becomes normal and the sugar disappears. The treatment is then omitted until the sugar reappears, when the iodide is again given in smaller doses. This treatment is kept up at intervals until the glycosuria has permanently disappeared. Iodism does not appear until the sugar has disappeared from the urine. The value of this treatment as a routine is very problematical. Williamson[2] again insists upon the value of *aspirin* and *sodium salicylate* in the treatment of diabetes. The former is given in powder form beginning with 10 grains twice daily and increasing to 15 grains four or five times per day. The sodium salicylate is given in peppermint-water, and from a small dose increased to 15 grains three to five times daily. Opium and its preparations, *jambul, uranium nitrate, arsenic,* and *antipyrin,* are useful in some cases. The opium has the disadvantage of causing constipation and in severe cases appears to predispose to coma. Thomson[3] states that the treatment depends upon the age of the patient; the condition of nutrition, which is indicated by the urea output, an excess of this indicating waste; the presence or absence of obesity which necessitates special medication on account of the heart. Thomson believes that drugs like opium have only a symptomatic action and that permanent change cannot be expected from their administration. He is enthusiastic in regard to the use of *cod-liver oil,* especially in young people. The younger the patient the more it is to be urged. The dose should be increased as much as possible. Believing that diabetes is a muscle disease he advocates the use of iron because of its oxygen-carrying property, and places it next in value to cod-liver oil. In order to prevent the constipation so often attendant upon the administration of iron Thomson gives it in the form of *Hooper's pills,* the formula of which is: sulphate of iron, 30 grains; powdered senna, powdered jalap, cream of tartar, powdered ginger, each grs. xij; ext. gentian, q. s. M.—Div. in pil. xxx. In addition to these remedies he speaks in favor of a class of drugs which he terms antiseptics, including the phenol derivatives, salicylates and benzoates. He places quinine and arsenic in this class.

Oefele,[4] believing the pancreas to be at fault in a larger number of cases, directs his treatment to this organ. For the involvement of the pancreas speaks the insufficient intestinal digestion, as well as local manifestations, such as dull pain in the left hypochondrium, reflex parræsthesia in the extensor muscles of the left shoulder and in the left ischiadicus, tenderness in the eleventh and twelfth intercostal spaces, and especially a girdle of dilated cutaneous vessels visible to the outer side of the mammary line in the hight of the left diaphragm. Local applications of iodine as well as massage, which increases the circulation of the blood in the abdomen and leads to the emptying of the pancreas, are indicated. Examination of the feces should be made in all cases of diabetes, and intestinal decomposition and marked acid reaction be treated. Deficient digestion of muscle tissue is aided by *pankreon,* and that of neutral fat by sapomedicatus (0.2 gm. in pills thirty minutes after eating). Barkan[1] has reported good results, in a man aged fifty-eight years, from *exercise* of a rather severe character, such as wood-chopping, brisk walking of eight to ten miles daily, etc.

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[1] Medical Record, April 16, 1904.

[2] Loc. cit.

[3] Loc. cit.

[4] Loc. cit.

In regard to the treatment of *coma* most authors are in accord. The accepted medication consists chiefly in milk diet and the administration of *sodium bicarbonate* by mouth, enema, or intravenously. Krause[2] mentions a symptom of diabetic coma hitherto unobserved. This consists in a high grade hypertonus of both eye-bulbs which Krause noted in 3 cases of diabetic coma about fifteen to thirty-two hours before death. In 4 cases of coma from other causes this symptom was not present, consequently it may be of value in differential diagnosis. No explanation of the phenomenon could be given. The administration of acetone, phloridzin, and beta-oxybutyric acids to dogs and rabbits in large quantities produced no positive results. A dog dying from diabetes after extirpation of the pancreas did not show the symptom nor was it possible to produce it by marked diminution of the blood pressure or by removal of water from the organism. The anatomical examination of these bulbs showed a normal condition.

DIABETES INSIPIDUS.

The occurrence of diabetes insipidus is rare and the report of several cases during the past year is of interest in reminding the practitioner of the necessity of careful observation, as the disease may be readily overlooked. The two chief symptoms are polyuria and excessive thirst, and these may be present for many years without any failure in health. Futcher[3] divides the condition into idiopathic and symptomatic. In the first class are included those cases in which no organic change can be found to which the polyuria might be attributed. Symptomatic diabetes is most usually traced to some lesion of the central nervous system, the most common being tumors of the floor of the fourth ventricle and of the medulla, basilar meningitis, and cerebral hemorrhage. Futcher thinks that cerebral syphilis is the cause of more cases than has hitherto been believed. Especially frequent is a syphilitic basilar meningitis. The occurrence of a transitory bitemporal hemianopsia in a case of diabetes insipidus is strongly indicative of its syphilitic character. In fifteen years only 7 cases of the disease have been met with in the Johns Hopkins Hospital and Dispensary, and of these 5 were symptomatic, and four of these undoubtedly syphilitic. In the majority of cases thirst was the first symptom complained of. Stein[1] discusses a case in which no organic cause could be determined clinically, and he expresses some doubt as to the condition being so frequently symptomatic. Grober[2] describes a case of diabetes insipidus in which there were marked symptoms of cerebral tumor. The patient was a man of probably thirty years of age, who had always been healthy and whose family history was good. He was married, and had two healthy children. In the spring of 1902 he was thrown from a bicycle and struck on his head. From that time on he suffered from frequent headache, but continued at work. In October of the same year he had an attack of typhoid fever lasting six weeks. Two weeks after beginning his work again he was suddenly seized with a headache on the left side, and the left eye began to swell, and he could not move it. He consulted an eye clinic, and was around for some days, when he became semicomatose and was placed in bed. There was no fever and the pulse was slow, 45 to 50. He had pain in left side of head, also in the neck and the first cervical vertebræ, which was increased by pressure and motion. There was paralysis of the vasomotor, and probably the abducens, and a paresis of the left facial as well. The knee-jerks were absent; there was no ankle clonus and no Babinski phenomenon. The urine examination on December 18th showed a specific gravity of 1030, while the amount for twenty-four hours was only 200 c.c. Daily examination showed a gradual increase in the amount passed with a corresponding decrease in the specific gravity until January 2d. The twenty-four-hour quantity was 9600 c.c., and the specific gravity 1005. Later on the mental condition improved and the patient was again able to work. After carefully discussing all sides of the case, Grober is of the opinion that the trauma was causal, although he admits that the typhoid fever may have been at fault, as cases occurring after typhoid have been reported.

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[1] Medical Record, June 11, 1904.

[2] Centralbl. f. innere Med., 1904, No. 20 (Society Report).

[3] American Medicine, May 28, 1904 (Society Report).

As already stated, the two chief symptoms are polyuria and thirst. Text-books fail to mention any special complications except the dryness of the skin. Recently, Brayton[1] calls special attention to the cutaneous manifestations in diabetes insipidus. Besides the harshness of the skin, these patients all had a more or less intense pruritus which was especially troublesome at night. In one of the patients there was a history of several attacks of alopecia areata which cleared up. In all the patients Brayton noted a rapid pulse, about 90.

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[1] Münch. med. Woch., 1904, No. 36.

[2] Ibid., 1904, No. 37.

The Treatment of Diabetes Insipidus is, as a rule, most unsatisfactory. Futcher advocates an antisyphilitic treatment on the ground of the frequent history of syphilis. In discussion of Futcher's article Tyson stated that potassium iodide had given good results. Stein[2] tried a large number of remedies on his patients without effect until he began the use of strychnia nitrate subcutaneously in ascending doses. The effect was prompt and immediate, and the output of urine was reduced from 18 litres to 4.5 to 5 daily. There was gain in the weight and general condition of health. Feilchenfeld[3] had already reported a great diminution in the urinary output in 2 cases of diabetes insipidus under treatment with injections of strychnia nitrate. There was, however, no increase in the specific gravity. He believes the drug to act directly on the nervous system. Wolff[4] used ergot in 2 patients with diabetes insipidus. One of them showed marked improvement. The quantity of urine diminished from 11,000 to 2000 c.c., and the patient gained in weight and strength. The result in the second instance was less marked. The thirst disappeared after the first dose. Wolff thinks the drug acts by contraction of the bloodvessels, thus lessening the quantity of blood which passes through the kidneys. He believes the primary cause of the disease to be a functional change in the renal epithelium. Finally, Dr. Hawke, Chief Resident of the Insane Department of the Philadelphia Hospital, mentions 3 cases of diabetes insipidus in which benefit was obtained by the administration of chloride of gold. The great number of drugs advocated is easily understood from the multiplicity of causes which lie at the basis of the disease. The good effect of antisyphilitic remedies is not so clear. In certain of the cases reported above there is a statement that the effect was almost immediate, and the question naturally arises as to how much suggestion had to do with the result. The occurrence of polyuria as a manifestation of hysteria is well known, and the difficulty of differentiating an hysterical polyuria from diabetes insipidus is a real one. Our knowledge of the metabolic changes in diabetes insipidus is too limited to permit of conclusions, but at present it would be better to withhold judgment as to cases which are apparently idiopathic.

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[1] Journal of the American Medical Association, August 6, 1904.

[2] Loc. cit.

[3] Deut. med. Woch., 1903, No. 31.

[4] Münch. med. Woch., June 9, 1903.

MYXŒDEMA.

Lack of space in last year's review prevented a discussion of this subject. By far the most pretentious article is that of Magnus-Levy,[1] who bases his publication upon 34 cases personally observed. He classifies the various forms of the disease under four headings—adult myxœdema, cachexia strumipriva, sporadic cretinism, endemic cretinism.

Adult Myxœdema. In the history of the patients some acute infectious disease, as erysipelas, and especially influenza, was given as the causal factor. This apparently only served to stir the disease into activity, and it had probably existed in mild grade some time before. In 2 cases there was apparently a mild Basedow's disease preceding. The family tendency was apparent in 2 cases. In one a severe case developed in a short time after a severe abortion in which there was no septic infection. Tuberculous family history was obtained only once. The disease began before the twentieth year in 3 cases, about the thirtieth year in 2 cases, and in the other cases between thirty and fifty.

SYMPTOMATOLOGY. The swelling of the skin is not usually general, and affects especially the head and face; occasionally other portions of the body, particularly the extensor side of the extremities. Marked tumor formation of the skin is infrequent. There was usually absence of sweat formation, and almost always a sensation of cold. The mucous membranes were generally swollen; changes in the hair were practically always present. The nails and teeth, as a rule, showed no change.

THYROID GLAND. In 5 cases is was distinctly enlarged but hard. In 1 case a slight remnant was found; in 5 other cases no thyroid was demonstrable. The heart was often enlarged, with murmurs present. Albuminuria was certainly present in 2 cases only. Sugar was absent except in 1 case, and then it was transitory.

SEXUAL FUNCTIONS. These showed no striking change, though the menses were irregular and scanty in many cases.

Menorrhagia and other hemorrhages were absent in all his women patients. In the one man patient there was apparently complete impotency. The body warmth was diminished and the weight increased, the appetite lessened, the bowel movements constipated.

NERVOUS SYSTEM. Motor disturbances were present in 2 cases in the form of tremors. In one of these the patient was hysterical, and in the other the tremor was probably the remainder of a preceding Basedow's disease. The peculiar waddling, "hippopotamus-like" gait the author does not believe to be dependent on nervous or muscular change. Difficulty in speech and monotony of speech, as well as hoarseness of the voice, appeared early. Disturbance of sensation with the inception of a subjective sensation of cold were not noted.

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[1] Zeit. f. klin. Med., 1904, vol. lii., Heft 3 and 4.

CEREBRATION AND INTELLIGENCE. Marked degeneration he found in only one patient, and does not think it is as frequent as the books usually describe it. There was usually a diminution in cerebration. There was apathy, depression of spirits, tendency to weeping, and rarely abnormal irritability; but even in severe cases intelligence may be entirely normal.

Cachexia Strumipriva. Only one patient whose condition of myxœdema could be attributed to operative removal of the thyroid gland is included in this series. This condition is now so infrequent that a brief résumé of the case is given. The patient was a boy of a healthy family who, on account of the danger of suffocation from an enlarged thyroid, was operated on in 1883 and the entire gland removed. He was then in his fifteenth year. The myxœdematous change soon began. In 1886 he was demonstrated as a case of cachexia strumipriva. From the time of his operation in 1883 up to 1896 he grew only 6 cm. in height, and the remaining development showed the same lack of growth. At this time, though twenty-eight years of age, he presented in size, sexual development, and general appearance the characteristics of a boy of fifteen years. It is to be emphasized that in this very severe example of athyroidism there was no especial mental deterioration, although there was a quantitative diminution in mental facility. The skin on the head, face, hands, and feet was quite markedly thickened, and to a less extent showed the same change with the rest of the body. The patient was rather thin. The examination of the blood showed a slight anæmia. The x-ray showed a distinct separation of most of the epiphyses.

Sporadic Cretinism. There were 9 of these cases in the series, 7 of whom were males and 2 females, which differs somewhat from the usual idea that the female sex is more prone to the condition. It is probable that sex makes but little difference. Four of the cases were severe and 5 were of the mild type. One of these cases is of special interest in showing a transition from the mild to the severe form of the disease. This patient from early youth showed evidences of thyroid insufficiency in his lack of normal growth, sexual development, and the presence of the cretin habitus. He showed a tendency to obesity. The condition of the skin in early life was uncertain. His intelligence and general psychical behavior were completely normal, and he was able to support himself as a writer in an office. In his thirty-first year, after a post-operative facial erysipelas, marked degeneration evinced itself, and he showed a picture of adult myxœdema arising in an otherwise healthy man. This case also points out the very distinct connection between sporadic cretinism and adult myxœdema.

Of the 5 mild cases 3 were in children. There was no marked disturbance of the intelligence, and the bodily manifestations dominated the picture. These children could scarcely be called cretinous in the ordinary sense of the word, and come well under the term formerly employed (myxœdema of children), which was supposed to be distinct from the true sporadic cretinism. Magnus-Levy does not believe that this distinction is justified, and he is inclined to the belief that these various types present simply varying grades, running from severe to mild, all of which can be best described under the name of hypothyroidisms. He has no doubt that the lighter grades would eventually become severe if not treated.

In studying the etiology Magnus-Levy notes that the majority of the cases developed in early life, at which time they presented but few signs of a diseased condition. The families of the patients were all healthy, and there was usually a large number of children in the family. The patients might be either the first or the last child of the family, or even might be one of the intermediate children. Taking into consideration the healthfulness of the families and the early age at which the disease manifested itself, the possibility of the disturbance in embryonal life must be thought of, and the disease attributed in many cases to maternal disturbances during pregnancy. In the severe cases a complete aplasia of the thyroid must be assumed, which is perhaps of mechanical origin.

Hertoghe has called attention to disturbances of the maternal organism during pregnancy as a cause of the milder cases, but the proof of this is very difficult to obtain. Severe disturbances in pregnancy could not be obtained in the cases of Magnus-Levy. In 2 cases a distinct history of increase in the severity of the disease after an infection was given. In the symptomatology of the disease it is noted that the stature is always diminished, and there is a corresponding diminution in weight; and sexual development is entirely null in the severe cases and tardy in the lighter ones. The changes in the skin are much like those found in adult myxœdema. The tumor-like formations around the chin and over the clavicles are much more frequent in the cretin. The specific facial expression is caused by a retraction of the root of the nose, as well as by the condition of the skin. This may be absent in severe cases and present in the mild ones. The hair is usually rough, but not always thin. The growth of the hair on the body is either absent or very slight. Disturbances in the condition of the teeth and nails are more frequent than in adult myxœdema. The mucous membranes are markedly thickened in the severe cases and less so in the milder ones. The thyroid gland was undemonstrable in practically all of the cases. In one patient there was originally a goitre which had been removed, with the exception of a small portion, but the gradual formation of this goitre as well as its removal were without influence on the general condition.

The internal organs showed little change; after long-continued cases albuminuria was occasionally found. Examination in 3 cases showed an approximately normal condition, except in 1 of very severe disease, in which there was well-marked anæmia. The remaining cases showed no clinical evidences of blood deterioration.

Temperature in the severe cases was continually low; the pulse was normal. Constipation was almost always present. A pendulous abdomen and waddling gait were well marked in the severe cases and less so in the mild ones. Disturbances of motion and sensation, with the exception of monotonous speech and the subjective feeling of cold, were not observed. The intelligence was of all grades from imbecility to normal. That the intelligence and mentality, even in cases with well-marked bodily symptoms, need not necessarily be influenced was shown by Virchow, and with this opinion Magnus-Levy is in accord.

Endemic Cretinism. There are 14 cases in the series of Magnus-Levy occurring in seven families. In four of these families several members were affected; in three only one, but in these three several members had goitre. Of the cases 8 were severe, 5 mild; 1 is treated of separately. From the statement of the people it would appear that the condition was more frequent in that region than previously. No connection between the disease and the water supply could be demonstrated. Most of these patients showed their first signs of disease during the first decade; only one developed after the tenth year, becoming distinctly affected after an attack of whooping-cough. In the symptomatology Magnus-Levy differs somewhat from Ewald and Bircher, who have taught that the myxœdematous change of the skin does not occur in endemic cretinism.

Magnus-Levy found in the lighter grades no distinct changes were evident in the skin of the body, but in all cases skin changes were noticeable at least on the head. In the more severe cases the typical skin changes were present over the entire body. The tumor formations on the neck and body were much more frequent. The mucous membrane in most of the cases was thickened like the skin. The hair was rough, and the nails and teeth were somewhat changed. The hands were moderately well formed. The thyroid was not demonstrable in a large number of the cases. One showed a small goitre. This is much in opposition to the usually expressed views in regard to the presence of goitres in cretins. The heart showed a slight enlargement; urine and blood examinations were not made. All the children showed a diminished stature, and in the severe cases lordosis, pendulous abdomen, and constipation were present. The intelligence was of all degrees, but there was no case of complete imbecility. The psychical attitude, with the exception of one case, was rather cheerful and friendly. One patient is of especial interest. The skin symptoms were very slightly marked, the height was distinctly but not markedly below the normal. The lack of intelligence was probably due in part to extreme deafness which was probably congenital. Cases of deafness with varying disturbances of intelligence, but without well-marked symptoms of body degeneration, are frequently met in the same regions with endemic cretinism. The connection between this degeneration and that produced by thyroid insufficiency is not very clearly defined. The frequency of the occurrence, however, would speak for a close connection.

Along with the clinical descriptions of the patients Magnus-Levy presents a series of investigations upon the respiratory interchange of gases in the myxœdematous condition before and after thyroid medication. He points out as factors to be considered in these studies the fact that in children the respiratory interchange is higher than in adults, and as cretins present the same condition as in a child, we must compare the results with those in a child of the same age. In practically all cases where the myxœdematous condition was marked a lowering of the respiratory interchange was evident; the degree of this diminution being in proportion to the severity of the symptoms. He concludes that "the low level of the gaseous interchange in severe cases of myxœdema is not produced through the lessening of the amount functionating protoplasm, but by a diminution in the life energy of the protoplasm. All severe cases of myxœdema show a marked diminution in the gaseous interchange to about 50 per cent. to 60 per cent. of that found in the healthy individual." Under the influence of thyroid medication there is a prompt increase in the gaseous interchange, beginning within a week after the commencement of the treatment, and increasing gradually to the fourth or fifth week. The amount of this increase is often very great, reaching as high as 50 to 70 per cent. more than the original worth. In the milder cases the increase in the gaseous interchange is only slight, not more than 20 per cent.—an amount of increase that may be brought about in non-myxœdematous patients by thyroid medication. These findings are not in accord with those of Kishi,[1] who found that metabolism was increased in animals after thyroidectomy.

The Treatment of Myxœdema and the allied conditions is the rational sequence to the belief that they are due to absence of thyroid action or secretion, and consists in the replacement of the deficient gland by administration of thyroids of animals. Magnus-Levy[2] discusses this fully on a basis of the 34 cases previously mentioned. It is of interest that his results in endemic cretinism were fully as good as in other forms of myxœdema, which is contrary to the experience of other writers. In classical cases a treatment of four to eight weeks' duration often leads to complete cure. The first signs of return to health are generally an increased feeling of warmth, and a beginning of the formation of sweat on the skin. The dulness and apathy diminish quickly, and the appetite and consumption of food become better, and the bowels less constipated and more regular. Movement and speech become more lively and spontaneous. Along with this there occurs (in the beginning associated with increased urination) marked decrease in weight; the skin becomes thin and supple, the gray and scanty hair appears in all its former freshness, and even takes on a new and darker color. In some cases, however, the administration of the organic extract must be continued over a long period of time. In many cases the treatment is not well borne, but it is very difficult to recognize these without a trial. These cases are usually those associated with marked weakness of the heart, and it may require years of treatment, directed to the heart and the bettering of the general condition, before a long trial is cautiously made with thyroid extract. In these cases small doses (½ to 2 tablets) over periods of four or six weeks, with frequent and long intermissions, and with great watchfulness, are necessary.

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[1] Virchow's Archiv, 1904, Bd. clxxvi.

[2] Therapie der Gegenwart, February and March, 1904.

The disagreeable accidents resulting in consequence of hyperthyroidosis consist in an abnormal feeling of heat, and a burning skin, irritability, hallucinations, sleeplessness, diarrhœa, loss of appetite, and, above all, in symptoms of subjective and objective heart weakness, with tendency to fainting. In children there develops, in consequence of their excessive and rapid growth, frequently a scoliosis or a kyphoscoliosis, consequently long pauses are necessary. When, by the usual beginning doses of one tablet in adults and one-half of a tablet in large children and one-quarter in children under three years, there are no unpleasant accompanying symptoms, the dose should be increased threefold every two or three weeks. Where a daily visit is impossible a smaller beginning dose is advised. To prevent recurrence after cure has been obtained it is necessary to continue the use of the drug; one tablet or even less is sufficient. An interruption of four to five weeks two or three times yearly is often useful to increase the reaction of the extract.

Magnus-Levy tried the various preparations of thyroid substance with a view to determining the most active. Comparisons were made with the ordinary tablets of thyroid extract (an extract of the entire gland), "thyroidin," "thyreoglobulin," and "thyreoantitoxin." As far as could be observed the results were practically the same with all varieties, and as the first one is the cheapest, and the last three have no claim to being unattended by disagreeable symptoms, the ordinary thyroid tablet is to be preferred.

From time to time attempts have been made to treat the condition by thyroid grafts. Christiani[1] claims uniformly successful results by following these rules: 1. The graft must be homothyroid. 2. Only normal living tissue may be transplanted. 3. Small multiple grafts must be made, taking care to implant them in very vascular regions.

Myxœdema and Diabetes. The occurrence of myxœdema in combination with diabetes mellitus is very unusual, and the cases reported by Gordon[2] are of interest. The first case was a child of three years, seen first January, 1903, with a history of illness for the preceding six months. During this time the child developed great thirst, polyuria, polyphagia, gradually increasing mental dulness, and extreme pallor of the skin. On examination the skin was seen to be of a waxy yellow color, slightly œdematous, and very dry. The eyelids were also puffy, but there was no pitting. The father stated that there had been a gradual increase in the size of the face, hands, feet, and abdomen, and that the whole body was puffy and larger than formerly. The mental condition was dull, and the child seemed to be entirely indifferent to his surroundings, and answered either not at all or very slowly. The blood showed 2,750,000 red cells; 14,000 white cells; 50 per cent. of hæmoglobin. The differential count was normal. The urine had a specific gravity of 1038, and showed the presence of glucose. A quantitative estimation of the latter was not made.

The second case, a brother of the first patient, was four and a half years old and showed the same physical characteristics as the first case, but to a more marked degree. The mental symptoms consisted of apathy with occasional outbreaks of excitement. The family history is interesting. One grandfather had had several attacks of delirium tremens; one grandmother suffered from gout and migraine; the father is a neurasthenic, and the mother was obese and had been treated for diabetes.

Both patients were put upon small doses of thyroid extract, and by the end of the first week there was a marked diminution in the thirst, polyuria, and sugar output. At the same time there was distinct improvement in the mental condition. The effect was first noted on the diabetic symptoms, and later on the myxœdema. At the end of four months all traces of the glycosuria had disappeared, and the children were apparently normal. At this time evidences of hyperthyroidism manifested themselves and the thyroid substance was omitted. After three weeks mental hebetude and glycosuria again appeared, and the thyroid was resumed in gradually increasing doses, without trying to approach the maximum dose. The younger child was given 1 grain and the older child 2 grains of the thyroid extract daily for a period of two months, since which time it has been omitted but without recurrence of the symptoms.

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[1] Medical Press and Circular, August 17, 1904.

[2] American Medicine, February 6, 1904.

A somewhat similar case has been reported by Strasser[1] in a child of eight years. This patient presented well-marked evidences of cretinism and gave a history of having undergone a course of treatment with thyroid extract during the previous year with considerable benefit. He was first seen July 7, 1902, and at that time was again placed upon thyroid extract, and under this showed distinct improvement; no urinalysis was made. In September of the same year he was again seen, and the mother stated that within the preceding two weeks he had developed constant, violent thirst, was nervously hungry, and was almost constantly micturating. The attack was said to have succeeded overindulgence in grapes and ripe fruit of other kinds. A urinalysis now made showed 10 per cent. of sugar which a few days later increased to 15 per cent., and 4 litres of urine were passed in twenty-four hours. Thinking that the thyroid medication might be at fault, this was stopped and he was placed on restricted diet. Under this he failed in weight and the carbohydrates had to be increased. A month later there was still 8 per cent. of sugar, and the myxœdematous condition seemed to be returning. He was again placed upon thyroid extract, but this was continued for only a short time. Later on he again began to improve both mentally and as far as the myxœdematous condition was concerned, but the diabetes progressed, the sugar remaining constantly at 5 per cent. or above. He died in coma February 8, 1904. No autopsy was obtained.

Both the above authors comment upon the infrequency of the combination of diabetes mellitus and myxœdema. But when we realize the relative infrequency of either condition in children the rarity of the combination is not surprising. The concomitance of two conditions the nature of which is so undecided naturally leads to speculation as to a possible causal relation between the two. Gordon, pointing to the recognized fact that adrenal substance administered in certain ways is able to cause glycosuria, suggests that it is possible that another deficient or defective internal secretion may have the same effect. He quotes Herter's experiments, which go to show that the adrenalin acts on the pancreas, and thinks it possible that the altered thyroid secretion may act in the same way. Gordon believes that, whether the thyroid disorder acts directly in producing the diabetes or indirectly by influencing the pancreas, his cases and their response to thyroid medication show a relationship between the two conditions. Strasser also speculates as to the causal connection, but from another standpoint. Inasmuch as the symptoms peculiar to the myxœdema improved with the progress of the diabetes, he suggests the possibility of the diabetes acting as a means of elimination of the mucin material deposited in the skin as a result of deficient thyroid action. In the light of our present knowledge theorizing is natural, but proof of the various theories offered is wanting.

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[1] Journal of the American Medical Association, March 11, 1904.

Disorders of the thyroid associated with glycosuria are not uncommon, especially in exophthalmic goitre, but here we have to do with a hypersecretion. The production of glycosuria in obesity after thyroid feeding is well known, but in conditions of lessened thyroid action the occurrence of sugar is very rare. When one considers the very large number of circumstances which may produce glycosuria it seems to be the wiser plan to accept new theories slowly, and only upon very strong proof.

ADDISON'S DISEASE.

While little that is new has been added to our knowledge of this disease, cases are reported from time to time, though the number of these is not large when we consider the prevalence of tuberculosis. A case reported by Russell[1] shows the usual course of the disease as it comes to autopsy.

The patient was a man, aged sixty-five years, with a good family history. In October, 1896, the left testicle was removed for tuberculosis. In February, 1897, the right testicle became atrophied. In May of the same year he began to complain of pain over the cartilage of the seventh left rib near the sternum. In September a small abscess was evacuated. No caries of the rib could be detected. In February, 1898, an abscess again formed and a sequestrum of diseased bone was removed. In June, 1900, a portion of the eighth rib and cartilages was removed. A suppurating sinus remained. His general health improved somewhat after the operation and he was able to attend to his buisness. In October, 1901, a distinct pigmentation of the skin was noticed. Pigment was especially marked on the dorsum of the hands and over the face and neck. The sclerotics, scalp, and mucous membranes of the mouth were unaffected. The lips, however, showed a distinct line where they came together. Pigmentation was markedly shown on the outer sides of the arms, folds of the axilla and groin, and wherever there was friction or pressure. The patient complained of weakness and was unable to perform any mental or physical work. The heart action was feeble; he was short of breath; had palpitation, a tendency to syncope, and coldness of the extremities. There was no noticeable emaciation. The appetite was variable and he had repeated attacks of indigestion, with vomiting and diarrhœa. He was given extract of suprarenal gland in increasing doses, beginning with the equivalent of 15 grams of the gland substance. The vomiting and diarrhœa were treated in the usual way. There was no improvement in the general symptoms, though a diminution of the pigment was noted. He died from asthenia on January 3, 1902. There was no coma or delirium. A limited autopsy failed to find the left suprarenal. It evidently had entirely atrophied. The right gland was enlarged and hard and completely degenerated. The whole medulla was found to have undergone tuberculous degeneration.

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[1] British Medical Journal, January 31, 1903.

The Results of Organotherapy in Addison's Disease. Within the past ten or more years attempts have been made to treat Addison's disease by the replacement of the absent adrenals through the administration of the gland substance of animals. The brilliant results of thyroid therapy in myxœdema and cretinism very naturally led to the belief that loss of the adrenal function could be compensated for in a similar manner. Adams[1] has collected 105 cases in which organotherapy had been employed, and from these attempts to draw conclusions as to its value. His cases are arranged into four groups:

Class I. Cases in which alarming or fatal results were presumably or possibly due to the treatment.

Class II. Cases uninfluenced by, or deriving but doubtful benefit from, the organotherapy.

Class III. Cases in which marked improvement coincided with the treatment.

Class IV. Cases in which permanent benefit (cures ?) accrued apparently as a result of the suprarenal feeding.

All the cases included under Class IV. had been under observation for at least one year.

The methods employed to secure the action of the foreign gland substance were as follows: suprarenal grafts; fresh glands by the mouth; hypodermic or intramuscular injection; fluid or solid extract by the mouth; mixed methods (hypodermically and by the mouth). The glands were obtained from various animals, including the dog, rabbit, calf, pig, lamb, ox, and cow, and in many instances it was specified that the medulla of the gland had been used. In not a few cases it was expressly stated that the suprarenals were from young animals.

In the 7 cases included under Class I. there is good reason to believe that death resulted in consequence of the operation in the three instances in which suprarenal grafts were made. Sudden death was also recorded in 5 other cases of the series during the course of organotherapy, but it must be remembered that sudden death is a well-recognized mode of termination in Addison's disease, whether treated or untreated. Such cases have been reported by Anderson and by Bradbury, and 3 out of Osler's 12 cases died suddenly. Severe cardiac distress may arise from the use of suprarenal preparations in other cases as well as in Addison's disease, when thus treated. On the whole there is no evidence to show that serious risk is incurred in Addison's disease by the ordinary methods of organotherapy.

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[1] The Practitioner, October, 1903.

In Class II. (49 cases) no appreciable benefit was obtained. It is only fair to say that many of the cases included in this class were moribund when treatment was begun. On the other hand, this is the class in which cases are apt to go unreported just because of the failure to secure improvement.

Before attaching weight to the more or less successful results attained in Class III. (33 cases) and Class IV. (16 cases), certain well-known features of the disease must be recalled, particularly the occurrence of remissions during which the patient may recover health and strength to a marked degree. Then, again, the effects of rest, hygiene, and good food must be considered in the treatment of any disease, and especially when it is of a tuberculous nature. Finally, there is always the possibility that a mistake in diagnosis may have been made. Thus Lloyd Jones, in writing to Adams concerning the later history of a case previously reported by Jones, states that after being from under observation for some months the patient was again seen and in the second instance a diagnosis of *pernicious anæmia* was made, and from this disease the patient died. No mention is made of an autopsy. Hale White, in 1896, mentions a similar case which he first treated with suprarenal extract under the impression that the patient was suffering from Addison's disease, but later found the condition to be pernicious anæmia. Adams has also seen a case of this kind. While the difficulty in diagnosis is undoubted and it is naturally impossible that an autopsy be secured in every case, Adams thinks it improbable that very many of the cases reported as showing improvement were incorrectly diagnosed. As distinct proof of the value of suprarenal medication are cases 59, 70, 80, 82, 83, and 97 of the series, in which the gland substance was administered over a long period of time and in which cessation was always followed by a relapse. Thus Dieulafoy's case (70) relapsed twice when the adrenal substance was withdrawn and as promptly recovered when this was resumed. Anderodias' patient (80) when last heard of remained well in spite of hard work, but found it necessary to take some of the extract daily. Oliver's patient (82) has been taking adrenal pills for eight years.

These reports serve to show that in some cases at least organotherapy is of great and lasting value, and the question naturally arises, Is it possible to recognize the proper case for adrenal administration? Careful comparison of the histories of these reported cases fails to answer this question satisfactorily. The treatment has apparently been signally successful in some of the least promising cases, where it was used late in the disease, and upon patients who had complicating tuberculous lesions elsewhere. Even an extreme degree of asthenia has not always militated against a degree of success which has seemed quite extraordinary, as evidenced in case 59 of the series. On the other hand, it has as signally failed in the simple, uncomplicated disease taken quite early. These contradictions are as yet unreconciled. It would seem, according to Adams, that the cases most likely to derive benefit are those in which the tuberculous process is a chronic sclerosing one, and where the other organs are fairly sound.

The author's deductions are as follows:

1. There would appear to be a certain class of cases of Addison's disease which derives indubitable benefit from the exhibition of some form of suprarenal substance, though in any given case it remains up to now impossible to determine its probable response to the treatment.

2. In any given case of the disease, selected haphazard, the probability obtains that disappointment will follow on the institution of organotherapy; but that probability is very distinctly less than that attaching to any alternative method of treatment at present known.

3. The last word upon the preparation to be used and its method of administration remains yet to be said. The problem seems to be to get a sufficient and continuous dose of the pure and active principle unchanged into the blood stream. Intravenous injection is impracticable.

Any judgment of the value of adrenal therapy must take into consideration the pathological processes concerned in the disease. The article of Vecchi mentioned in PROGRESSIVE MEDICINE in 1902 seemed to make this very clear. From his experiments on animals this author came to the conclusion that typical Addison's disease was the sum of two factors—suprarenal insufficiency plus tuberculosis of the other organs that may be involved in the particular case. With this conception of the disease it is evident that the effect of any treatment directed against the suprarenal insufficiency will depend to a large extent upon the management of the general tuberculous condition, and differences in the latter may account for some of the discrepancies in the reported cases. In the light of our present knowledge of tuberculosis it would seem impossible to attain good results from any form of specific medication unless proper attention is given to improving the general nutrition by abundant food, fresh air, and the regulation of exercise, etc.

From Adams' statistics it would appear that the combination of the general with the specific treatment would be of great value.

Concerning the form in which the gland should be given and the dosage, Adams makes no statement. In his series none of the cases were treated with the newer adrenal preparations—"adrenalin" and "suprarenin." From personal experience with the former it would seem to be an uncertain and perhaps a dangerous remedy to use in Addison's disease, as there is no way at present of gauging its effects unless it be given intravenously. Given by the mouth in large doses no change was produced in pulse-rate or blood pressure. Given hypodermically in a dose of 15 minims in one case no effect was noted; the same amount in another patient caused breathlessness, increased rapidity of the heart, and faintness. The urine passed within six hours after this amount of adrenalin by injection gave a distinct reaction with Fehling's solution. Where the adrenalin was used intravenously, as in cases of surgical shock, no reducing substance was found in the urine passed later.

EXOPHTHALMIC GOITRE.

The literature of the past year has been rather unproductive on this subject. Two cases reported by von Voss[1] are worthy of note on account of the unusual features present.

The first case occurred in a girl, aged twenty-two years, who was admitted to the hospital February 18, 1902. For five months previous she had suffered from palpitation of the heart and weakness, after which enlargement of the thyroid was noted. Besides, she had sweating and occasional attacks of dizziness. For six months the menstruation had been scanty. In the preceding month there had been much excitability and occasional attacks of diarrhœa. There was no hereditary taint. Physical examination showed her to be of normal build and moderate nutrition. The thyroid was enlarged particularly on the right side; was moderately hard, and a distinct systolic bruit could be heard over it. The neck measured 35 cm. The heart was enlarged to the left and a loud systolic murmur was audible over both the aortic and pulmonary areas; there was also marked pulsation of the carotids. The signs of Moebius and Graefe were not well marked, though both eyes showed exophthalmos. The pupils were equal in size, not enlarged, and reacted normally; there was slight nystagmus, marked general tremor, and dermographia. The tendon reflexes of both upper and lower extremities were increased and the skin reflexes were very lively. Occasional cramps occurred in the calf muscles. The pulse when recumbent was 120, which increased to 160 on rising; tension was increased.

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[1] Deutsche med. Wochenschrift, August 13, 1903.

The patient improved gradually for two months under the administration of bromide and sodium phosphate with galvanism to the thyroid. She then suddenly grew worse. The pulse became more rapid, there was frequent vomiting, and she failed rapidly in weight. The condition grew desperate, resembling an acute intoxication. Bromide, strophanthus, and convallaria being without effect, she was given 450 c.c. of normal salt solution subcutaneously. Within half an hour the pulse improved and the patient, previously delirious, became clear mentally. Four hours later the temperature, which had hitherto been normal, became elevated. This gradually fell and improvement was continuous until she was sent to the country. Here she felt so well that she returned to her work as a housemaid. In November she was again admitted, complaining of increased size of the goitre, dizziness, palpitation, and diplopia. The physical examination was practically as before. In addition there was a more marked exophthalmos, especially on the right side. The right superior rectus was paralyzed and the right abducens paretic; the left inferior rectus was paralyzed and the left adducens paretic. On the right there was a slight facial palsy. The pupils were normal. During the next two months the palsies varied greatly, the motion at times being almost normal. She passed through an attack of acute articular rheumatism and was again discharged as improved, with directions not to resume her work as a servant. A later report says that the diplopia still persists to a moderate degree.

The second case, an unmarried woman aged thirty-four years, stated that ten years previous she had suffered from nervousness and headache and had had palpitation of the heart and restlessness. Two years previous she first noted weakness in the left hand and seven months previous had remarked a weakness and tremor in the left leg. The manifestations of weakness had varied greatly in intensity, but in the preceding five months had become more marked. At that time the menstruation ceased, but reappeared three months later, along with obstinate diarrhœa, which had weakened her to such a degree that she could scarcely walk.

Physical Examination. The patient was of medium size, poorly nourished, and anæmic. There was slight exophthalmos, more evident on the right side. There was insufficiency of convergence; Stellwag's and Graefe's signs absent. There was a small, rather hard goitre, with no bruit. On excitement there was a fleeting redness of the face and roseola psychica on the chest. The heart was enlarged to the left; pulse 124. The hands showed a fine tremor. The strength of the arm muscles was not very great. The station was equally good with the eyes open or closed. The gait was slow and, in consequence of the tremor of the left leg, uncertain. When recumbent the movements of the legs were not ataxic, but the left leg trembled greatly. Weakness was demonstrable in the flexors of the thigh and leg and in the extensors of the feet (tibialis anticus, peronei), especially on the left side. Both the adductors and abductors of the left leg were weakened. The tendon reflexes were markedly increased and ankle clonus was present on both sides. Treatment was ineffectual and she was discharged unimproved.

On a second admission the general condition was seen to be somewhat better, but she now showed palsy of the eye muscles. The palsies were multiple and occurred on both sides, being most marked in the right superior rectus. Both eyeballs were prominent, but this prominence was not the cause of the palsy. Other etiological factors than the Basedow's disease could be definitely excluded.

Moebius in his monograph in the Nothnagel series has commented on the infrequency of palsy of the eye muscles in exophthalmic goitre, and in the later literature von Voss has been able to find only 3 cases similar to these just reported. The origin of such palsies is not clear. In Bristowe's case the autopsy was negative. Von Voss is of the opinion that the view of Moebius that the palsy is of nuclear origin is correct. Whether the change is vascular or the elective action of a poison remains undecided. The variation of the palsies in these cases is striking. The peculiar disturbance of motility in the second case the author thinks resembles the choreic tremor described by Kahler, only in this instance the extremities were affected instead of the head. There was no occasion to suspect sclerosis or hysteria.

A case of *palsy of the extraocular muscles* is reported by Posey,[1] who finds from a search of the literature that the condition is more common than is usually believed. He mentions the grouping of Buschan into (1) cases complaining of diplopia, the muscles at fault not being ascertained; (2) palsy of the rectus internus; (3) palsy of the rectus externus; (4) palsy of the rectus superior; (5) palsy of the trochlearis; (6) palsy of the levator palpebræ of both eyes. In Posey's case there was palsy of the left sixth nerve, of the portion of the left third nerve supplying the inferior oblique and the superior and inferior recti muscles. There is a tendency to refer these palsies to an involvement of the central nuclei, which would be a point in favor of the idea that exophthalmic goitre is of central origin. The exact site, however, of the palsies has not as yet been determined. Since the palsies are sometimes transient, and in case autopsied no pathological changes have been noted, Posey thinks it probable that the morbid process is only functional, consisting of an irritation of the centres by toxins generated by some perversion of the action of the thyroid.

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[1] American Journal of the Medical Sciences, July, 1904.

Exophthalmic Goitre in Infancy. Barrett[1] has collected 42 cases of exophthalmic goitre in children below the age of fifteen, the youngest being a child of four and one-half years old. These figures show that the condition is uncommon in childhood, especially in the earlier years. The symptomatology does not differ much from that of the ordinary adult form, and the three cardinal symptoms of tachycardia, goitre, and exophthalmos exist, though the last is sometimes less marked than in adults, and may be unilateral. Tremor is uncommon in the child, but on the contrary chorea is very common. There is great irritability of character. The disease is apt to come on more rapidly in a child, sometimes appearing suddenly, or becoming apparent in the course of a few days, the cardiac phenomena being the first to attract attention.

In some cases goitre is present for a considerable time before the appearance of other symptoms. The writer records some instances in which tremor was the first symptom to appear; fatigue and headache usually set in early. The duration of the disease is not so long as in the adult. The writer quotes 3 curious cases, 1 in which exophthalmic goitre appeared suddenly and subsided in the course of seven days, while in the 2 other cases it lasted six weeks. Two to three years, he records, is the limit.

Acute Suppurative Thyroiditis. Roth[2] reports a primary case of this very rare condition. The patient was an Italian laborer aged forty years. He was admitted November 26, 1902. As far as could be learned (the patient spoke English badly) he was taken suddenly with a chill and high fever on November 23, 1902. He became gradually worse until time of admission. On admission his temperature was 103.2° F., pulse 128. He was cyanosed, sweating profusely, and seemed profoundly septic. A diffuse swelling was found around the anterior portion of his neck, extending from the suprasternal notch to the upper border of the cricoid cartilage. The most prominent portion of this swelling was reddened, but there was no fluctuation. The mass was tender and dilated veins could be seen around the shoulders. The breathing and swallowing and moving of the head were difficult. No other abnormality was found. An operation was immediately performed. The exposed thyroid was smooth and dark blue in color. The capsule was dull. The opening on the left side showed the presence of pus and areas of necrosis were also found in the gland. The operation was rapidly terminated on account of the desperate condition of the patient. Temperature rose until it reached 107°. The condition became worse and in spite of all treatment the patient died on November 27, 1902. Post-mortem examination showed no abnormality except in the thyroid gland. Both lobes were enlarged and swollen, the right lobe to a greater degree. In the right lobe (?) there was an incised wound leading into a small irregular cavity. The microscopic examination showed leukocytic infiltration of the connective tissues, polynuclear leukocytes predominating. The colloid contents of the acini were obliterated by the cellular infiltration. In places there were areas of necrosis and abscesses. A pure culture of streptococci was obtained. The source of infection was undetermined. Rheumatism could be excluded. The author calls attention to the extreme severity of the constitutional symptoms, which might possibly be attributed to the interference with the thyroid secretion.

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[1] Journ. de méd. et de chir. prat., July 10, 1902.

[2] American Journal of the Medical Sciences, January, 1904.

Treatment of Exophthalmic Goitre. The drugs and methods of treatment advocated in exophthalmic goitre are almost innumerable. Von Voss[1] speaks in favor of subcutaneous transfusions of normal salt solutions in bad cases, thinking that in this way the poison can be diluted or washed out. One of his cases showed very marked improvement after the injection of 450 c.c., but it is difficult to understand how so small a quantity could produce much effect. The same author warns against the use of iodine in ordinary goitre as well as in Graves' disease. He also says that very active drugs such as strophanthus and digitalis may act harmfully. Lanz[2] reports favorable results in 5 cases from the use of milk from thyroidectomized goats. (This method of treatment was fully discussed last year.) Moebius in the same journal speaks rather guardedly of antithyreoidin. The price of this preparation is so very high that it prohibits thorough investigation. Chaddock[3] reports 2 cases successfully treated by sodium salicylate, as suggested by J. Babinski. The salt was given in a dosage of 30 grains daily. In its administration care must be taken that the salt is a pure one in order to avoid irritation of the stomach, and the urine must be frequently examined. No explanation for its action is offered. Finally Roberts[4] reports 3 cases of exophthalmic goitre successfully treated by tabloids of didymin given in a daily dosage of 10 grains and gradually increasing to 20 grains daily.

When one considers the variety of remedies and remedial measures advised it is evident that in many of the cases the therapeutic treatment can hardly be looked upon as being the cause of the improvement that may occur. Cases of Graves' disease in the milder form, but with typical symptoms, are often seen which show distinct improvement or even apparent cure on the simplest of medication, or even none at all, if the life of the patient is properly regulated.

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[1] Loc. cit.

[2] Münchener med. Wochenschrift, No. 4, 1903.

[3] Journal of the American Medical Association, April 18, 1903.

[4] British Medical Journal, June 2, 1903.

Such patients if kept under observation for a long period of time are apt to show a recurrence of the symptoms if exposed to depressing influences. No rules can be given which can serve as a guide to the proper selection of treatment for the individual case.

SCURVY.

The report of cases which can be tabulated under the name of scurvy is of infrequent occurrence. Although no definite decision has been arrived at as to the nature of and cause of the disease, the diminution in the number of cases is proof that existing regulations have been of effect in stamping out the disease. There are two theories generally accepted as to causation. The first, and perhaps the most widely believed, considers the disease as due to a lack of some form of food necessary to the maintenance of the body functions, and as the disease has been most frequently seen in camps and on vessels, when the supply of fresh vegetables was limited, it has been held that an absence of this form of food tends to produce scurvy. The other theory holds that some form of microbic infection is causal, and the occurrence of the disease among a number of people at the same time and under similar circumstances lends some plausibility to this view. A recent article by Coplans[1] is of special interest because of circumstances which permitted unusually accurate observation. The cases of scurvy were met with in camps in South Africa, where, owing to the military regulations, the mode of life of all persons was much the same, and as the diet was furnished by the government a careful study of this was possible.

The symptoms presented by the patients were anæmia; spongy, bleeding gums; lassitude; breathlessness on exertion, followed later by lameness associated with synovitis and hemorrhages, and brawny, indurated swellings on one or both of the lower limbs. The blood showed marked poikilocytosis. Death resulted from cardiac failure, and on autopsy the heart muscle was found to be thin and pale, and the right side showed dilatation. There was an excess of fluid in the pericardial cavity. No nervous lesions were found. The urine presented no abnormalities. The disease first broke out at the camp at Middleberg and was thought to be due to the food. Both Europeans and natives were affected. A careful study of the conditions revealed the fact that the diseased individuals did not live up to the ordinary rules of personal cleanliness, and it was recalled that exactly the same kind and quantity of food was supplied to the camp at Standerton and Volkrust, where no scurvy was present at that time. It was noted, however, that the sanitary condition of these two camps was greatly superior to that existing at Middleberg. In this latter camp a new scale of rations was given and a plentiful supply of soap and fuel allowed, with the result that the scurvy disappeared. According to Coplans the improved cleanliness brought this about. Much later scurvy broke out in the Standerton district after troops had been concentrated in close proximity to the town. The disease continued and increased after soldiers and other classes were allowed to add to their diet by the purchase of fruit and vegetables. A special inquiry revealed the fact that those suffering from the disease were taking fresh vegetable food regularly. It was also found that the larger number of cases occurred in the native Sanitary Corps, 76 per cent. of whom were diseased. The only European affected was attached to this corps, but his food was entirely different from that of the natives. These natives were generally uncleanly in their habits, with the exception of the head native and his family of six, who lived by themselves and were unaffected through eating the same food as the rest. The European who was diseased was intimately associated with the natives, sleeping with them, though eating different food. In the Native Labor Corps only 16 per cent. were affected, this being attributed to their greater cleanliness, as they were taking the same food as the other natives. No case of scurvy was found among 150 natives employed as servants to the European camp staff, nor among the natives employed as domestic servants in the military messes, shops, and households. Of those admitted with scurvy to the hospital at Standerton, 12 per cent. died; 90 per cent. of those who recovered returned to their former duties, former dietaries, and former surroundings, and though living with men afflicted with scurvy no case of recurrence was reported. The author believes that these facts are opposed to the contention that the food was the sole cause of the disease. The infection appears to occur through the mouth, the whole system being involved secondarily and later. The manner in which the primary infection occurs, and how it gives rise to the manifestations of disease in the mouth, are points not easy to explain. He thinks the facts go to show that scurvy is not due to either the presence or absence of any particular kind of food from the dietary, but rather to an infection for which food may act as a vehicle under conditions of dirty storage or dirty preparation; and, considering that the disease prevailed in inverse proportion to the standard of personal hygiene of the individuals affected, its infectivity would seem to depend on the unsanitary habits and perhaps the unwholesome occupation of those who were its victims.

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[1] Lancet, June 18, 1904.

These observations of Coplans, backed up by careful investigation, deserve consideration. The difficult part of the study of scurvy lies in the uncertainty of diagnosis in isolated cases. Cases of hemorrhagic character occurring sporadically cause much trouble in classification. Two such instances are reported by Wagner.[1] The first occurred in a woman, aged forty years, who was admitted to the hospital April 19, 1904. The previous medical history was negative. She was employed as a domestic servant. Her illness began in February, 1904, with a feeling of weakness and lassitude, and a frequent "stitch" in the right side. The weakness increased and she had frequent diarrhœa. In April she saw a physician, who was unable to find evidences of any distinct disease. The condition growing still worse, a second physician was seen, who sent her to a hospital, where the first hemorrhages were noted in the lips and gums, and later on in the skin of the whole body. These spots gradually disappeared to be replaced by new ones. About this time she began to complain of dryness in the mouth and thirst. The breath became foul and there was increase in the saliva, which was of a fetid, mucous character. Still later there was fever, swelling of the submaxillary glands, sweats, and pains in the chest. When seen there were numerous bluish or reddish flecks over the body; hemorrhagic spots on the gums, palate, and mucous membranes of the mouth; temperature, 37.2 C.; marked *fetor ex ore.* The spleen and liver were not demonstrably enlarged. Active and passive movements of the joints caused pain, but nowhere were the joints swollen. At the site of a hypodermic injection there appeared a large swelling, and from the puncture a thin, bloody fluid exuded for a long time. The patient died two days after admission. No autopsy was obtained. A blood count made about one hour before death showed a leukocytosis of 75,000. A stained specimen showed the normal appearance of the red cells. The white cells varied greatly in size; all stained a light (hell) blue by the May-Grünwald stain; no distinct granulation noted in the cells. The large cells looked like large lymphocytes.

The second case was also in a servant girl, aged twenty-one years, whose previous history was negative except that she had had chlorosis at the age of seventeen, but this was of a light grade and required no treatment. She was admitted to the hospital April 28, 1904. Fourteen days before she noticed a pain in the gum, for which she consulted a dentist, who cauterized it. A short time later she noticed an unpleasant odor from the mouth and an increase of the gum inflammation in spite of care in cleansing the teeth and mouth. On April 25th she consulted a physician, who found only the signs of the former cauterization and a loose, carious tooth, which he extracted. The hemorrhage following the extraction was so great that she had to stay a considerable time in the physician's office. This physician, on making an examination, found numerous bluish flecks upon the body, and was told that these had been coming for some time. The hemorrhage from the tooth lasted two days. She was found to have some fever. The condition did not improve under the treatment, and she was sent to the hospital. According to the patient the bluish flecks had only appeared within the past eight days. There was a history of a possible abortion, but this was denied absolutely by the patient. The physical examination showed the patient to be well nourished. The hemorrhagic flecks were chiefly found on the extremities. The gums were spongy, and the site of the extracted tooth was gangrenous. The remaining organs were apparently normal. Liver and spleen were not palpable. The urine showed a little albumin and a few hyaline casts, besides numerous leukocytes and flat epithelial cells. Blood count, 3,150,000; leukocytes, 5000. On staining there was found slight poikilocytosis and slight increase of lymphocytes. Cultures from the blood were negative. With the progress of the disease the face became swollen, as did the submaxillary glands. Small hemorrhages appeared in the tongue. The general condition grew rapidly more grave, and death occurred on May 6th. Shortly before death a blood count showed a leukocytosis of 30,937. The autopsy showed marked hyperæmia and hyperplasia of the spleen; numerous ecchymoses in the skin, serous membranes, mucous membranes, especially of the stomach and intestines; effusion in pleuræ and pericardium; general pallor.

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[1] Münch. med. Woch., Nos. 36 and 37, 1904.

Both of these patients were servants, and living under conditions such as usually do not cause scurvy. The author calls special attention to the occurrence of fever as pointing to the fact that these cases could not be included under hemorrhagic purpura. His long discussion fails to bring out anything new, and likewise fails to prove that the cases reported were really scurvy. The history and the short duration all point rather to acute leukæmia. The blood examinations are so incomplete that much cannot be learned from them. It must be remembered, however, that leukæmia without a numerical increase in the leukocytes is of comparatively frequent occurrence, as has been pointed out by Kelly.[1] The cases above described resemble more nearly the case of hemorrhagic leukæmia reported by Wister and Gwyn[2] than the ordinary description of scurvy. They are given in detail to point out the varying conditions that may be reported under the head of scurvy. There is need for a revision of nomenclature in the so-called hemorrhagic diseases.

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[1] Loc. cit.

[2] University of Pennsylvania Medical Bulletin, April, 1904.

OPHTHALMOLOGY.

By EDWARD JACKSON, M.D.

DISEASES OF THE CONJUNCTIVA.

Bacterial Infections. The difficulty of discriminating between the diphtheria bacillus and the xerosis bacillus as found in the conjunctiva, and the confusion arising therefrom, have been spoken of in previous years. Heretofore nothing but inoculation experiments could be regarded as conclusive. A test now brought forward by Arnold Knapp[1] seems to furnish a readier and possibly more certain means of discrimination. He uses a fermentation test similar to that employed by Hiss to differentiate the pneumococcus. A 1 per cent. solution of each of the following sugars, dextrose, mannite, maltose, lactose, saccharose, and dextrine, is made in a medium composed of beef-serum 1 part, distilled water 3 parts. Finally some litmus is added.

It was found that the diphtheria bacillus caused the medium containing dextrine to become red and coagulate, while saccharose was unchanged. On the other hand, the xerosis bacillus produced fermentation with acid production in saccharose, while dextrine remained unaffected. The pseudodiphtheria bacillus of Hoffmann affected none of the sugars. The reactions required twenty-four to forty-eight hours. These results proved constant with 28 diphtheria, 10 xerosis, and 4 pseudodiphtheria series. Knapp reports one case in which the diphtheria reaction was shown, although the conjunctivitis from which the bacillus was obtained did not seem to jusify such a diagnosis. Inoculation of the guinea-pig, however, caused death in thirty hours, with the typical lesions of diphtheritic infection.

In discussing Knapp's paper, Randall and Woods reported cases of mild and chronic conjunctivitis, associated with the diphtheritic bacillus, which yielded only to antitoxin treatment. Stephenson[2] has reported a case of diphtheria of the conjunctiva, fatal through toxæmia, although no other mucous membranes were involved.

The presence of bacillus subtilis in the conjunctiva has generally been considered accidental, and not significant. Gourfein,[3] however, has demonstrated the presence of this bacillus in 17 cases of acute conjunctivitis. The patients—men, women, and children—had been struck in the eye with earth. The disease affected both eyes in 11 cases. It lasted from six to eighteen days. There was nothing to distinguish it clinically from other forms of acute conjunctivitis. The cornea was slightly involved in 2 cases. In 5 cases the bacillus subtilis was found in pure culture. In the others it was associated with saprophytes, staphylococcus aureus, streptococci, and the pneumococcus. Experimentally, the bacillus caused conjunctivitis in rabbits when injected into the injured conjunctiva, and panophthalmitis when injected into the vitreous. Ulbrich[1] also produced a panophthalmitis by injecting a culture into the vitreous, and iritis by injections into the anterior chamber.

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[1] Transactions of American Ophthalmological Society, 1904, p. 283.

[2] Ophthalmoscope, August, 1904.

[3] Transactions of the Tenth International Congress of Ophthalmology, Lucerne, September, 1904.

Influenza Bacillus and Trachoma. A case of severe pseudomembranous conjunctivitis in an infant is reported by A. Knapp,[2] in which the influenza bacillus and xerosis bacillus were found. Mueller[3] suggested that trachoma was due to a bacillus which zur Nedden identifies as the influenza bacillus. The latter, however, positively denies that this bacillus is the cause of trachoma. The cases in which he found it were not cases of trachoma, while in trachoma he found only accidental organisms.

A. Knapp,[4] in a bacteriological study of trachoma, encountered this bacillus in 8 out of 120 recent cases. It was not identical with the Koch-Weeks bacillus, but it could not be differentiated from the influenza bacillus in any way. Its presence in trachoma seemed accidental.

Phlyctenular Conjunctivitis. Ever since it was shown that most manifestations of "scrofula" were tuberculous in character, the relation of the tubercle bacillus with scrofulous ophthalmia has been a subject of especial interest. Bruns,[5] following a suggestion of Leber, has experimented on the rabbit by injecting dead tubercle bacilli into the external carotid artery.

In 33 experiments 7 animals died without eye lesions; in 10 the eye was lost through necrosis; in 6 the eyes remained normal; in 5 there was produced the clinical picture of phlyctenular conjunctivitis, and in 5 there occurred lesions of the uveal tract without any phlyctenules. The cases presenting phlyctenular lesions are described at length, with microscopic examinations of the lesions, which seem to have been quite similar to those of phlyctenular disease as seen in children. The chief differences observed were that the phlyctenules were smaller than in the human eye, did not go on to ulceration, and did not in any case involve the cornea.

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[1] Graefe's Archiv f. Ophth., vol. lviii. No. 2, p. 243.

[2] Archives of Ophthalmology, July, 1904.

[3] PROGRESSIVE MEDICINE, June, 1904, p. 298.

[4] Archives of Ophthalmology, September, 1904, p. 463.

[5] Klin. Monatsbl. f. Augenh., January, 1904, p. 47.

Vernal Conjunctivitis. The dozen papers dealing with this subject that have appeared during the last year have added a little to our knowledge regarding it. Schieck[1] has found an abnormal development of elastic tissue underlying the conjunctiva, both in the lids and at the limbus. He makes this an important point in the pathologico-anatomical differential diagnosis of the affection. The degree of epithelial hypertrophy he finds more variable.

Johnston[2] finds the thickening of the epithelium more characteristic, although the increase of connective tissue is also prominent. He thinks the microscope establishes the fact that "vernal catarrh" is not a catarrh, but partakes of the nature of a new growth. Veasey[3] reports a case in which the growth resembled malignant disease of the limbus. This growth was removed in October, but recurred in May. Microscopic study of it then proved that the case was one of vernal conjunctivitis, and later similar patches appeared in the other eye.

My suggestion[4] that *Parinaud's conjunctivitis* and vernal conjunctivitis ought to be carefully studied for a possible connection with micro-organisms other than bacteria had already been acted on by Fortunati.[5] In excised pericorneal nodules he thought he discovered blastomycetic forms, and from cultures made from such nodules he isolated two varieties of blastomycetes—one round, the other oval. Inoculated upon lower animals both caused local lesions, without any influence on general health. Introduced into the human conjunctiva the round form provoked an irritation that quickly subsided. The oval variety caused nodules which recurred during the warm months, but without other characteristic symptoms of vernal conjunctivitis.

Remmen[6] reports as instances of this affection three cases that were quickly cured by the administration of moderate doses of sodium salicylate. But only one of the cases had been similarly affected in previous years.

Gallemaerts[7] has resorted to destruction of the conjunctival growths by electrolysis, used under general anæsthesia, with a current of 2 or 3 milliamperes. He secured decided amelioration of the symptoms, but not complete cure. In regard to the case of cure by x-ray applications reported last year,[8] Allport,[9] in a supplementary report says: This case is undoubtedly and permanently cured, having remained free from a single unpleasant symptom last summer without going to either mountains or seashore.

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[1] Graefe's Archiv f. Ophthal., Bd. lviii. Heft 1, p. 1; Bd. lix. Heft 3, p. 553.
[2] Ophthalmic Record, April, 1904.
[3] American Journal of the Medical Sciences, May, 1904.
[4] American Medicine, November 12, 1904.
[5] Archivio di Ottalmologia, October, 1904.
[6] Ophthalmic Record, November, 1904.
[7] Polyclin. de Bruxelles, February, 1904.
[8] PROGRESSIVE MEDICINE, June, 1904.
[9] Ophthalmic Record, December, 1904.

Parinaud's Conjunctivitis. This disease, heretofore scarcely mentioned outside of French and American literature, has attracted wider attention. Verhoeff and Derby[1] report a case which was carefully studied by the microscope and by culture methods, and they have collected 22 other cases, to which must be added cases reported by Stirling,[2] Matys,[3] and Salva.[4] Their bacteriological results, like those previously reached by others, were negative. The only organisms found were the xerosis bacillus and the white staphylococcus. Careful search revealed no fungi or protozoa. Tissue fragments inoculated in the anterior chamber of the rabbit and groin of the guinea-pig were absorbed without causing disturbance. The lesions consisted of marked cell necrosis, with extensive infiltration of the subconjunctival tissue with lymphoid and phagocytic epithelioid cells. The epithelium was at some points thinned, or even eroded. Of the 26 patients 15 were male, 11 female. Their occupations were too varied to give much support to the theory of animal infection. Their ages ranged from two to sixty-five years. In but 2 cases have both eyes been affected. The majority of the cases occurred in the autumn. All have arisen in the temperate zone.

The characteristic symptoms are the appearance upon the inner surface of the lid and in the fornix of large, reddish, semitransparent polypoid masses, with smaller yellowish granules between. Erosions are found, especially between the granules. Ulceration may occur, but is not characteristic. There is little if any conjunctival discharge. The lids are swollen, and the granulation masses may be felt through them, resembling chalazia. On the affected side there is swelling of the parotid region, and suppuration of the related lymphatic glands may occur. The patient suffers from fever, irregular chills, and sometimes loss of flesh. The disease ends in complete recovery, running its course in from three to twelve months.

It is noticeable that considerable series of cases have been reported by a few observers: Parinaud, 4; Gifford, 4; Sans, 3; Chaillous, 4. This might mean that the disease is more common than would appear from the literature, but has not been generally recognized; or it might mean that the disease is largely confined to certain localities. A more general search for it will probably decide which is the true explanation. It must be differentiated from tuberculosis by the absence of tubercle bacilli (which may only be revealed by inoculation) and the slight extent of the ulcerations. From trachoma it is distinguished by being usually confined to one eye, the large granulations, the parotid swelling, and the fever and other evidences of general sickness.

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[1] Archives of Ophthalmology, June, 1904.

[2] Ophthalmic Review, October, 1904.

[3] Zeitschr. f. Augenh., October, 1904.

[4] Le Dauphine Medicale, No. 3, 1904.

The most effective treatment appears to be the excision of the larger granulations. Stirling reports a remarkable amelioration of the ocular symptoms, following excision of the preauricular, submaxillary, and cervical glands. In Matys' case the ocular lesions followed severe inflammations of the nose and throat. Stirling, who found the xerosis bacillus in pure culture in the affected eye, but not in the fellow eye, tried diphtheria antitoxin without any marked beneficial affect. The ordinary antiseptic local applications of silver salts, mercurials, etc., seem to have little or no beneficial effect.

Purulent Conjunctivitis. Standish[1] compares the results obtained by the treatment of this disease with nitrate of silver and with the newer silver salts. Of 50 cases of *ophthalmia neonatorum* treated with silver nitrate, in which the cornea was clear when admitted to the hospital, 3 subsequently developed corneal ulcers which interfered with vision.

Of 50 cases treated with protargol, and 64 with argyrol, none developed corneal ulcer. Of 98 cases of *gonorrheal ophthalmia* in persons over five years of age, 48 were treated with protargol. Of these 32 were admitted with clear corneas, of whom 21 were discharged without corneal lesion. Of the 27 cases in which corneal lesions presented or developed, 4 eyes were lost. Of the 37 cases in which argyrol was used, 23 were admitted with clear corneas, and 16 discharged without corneal lesions. Of the 26 cases in which corneal lesions developed, 8 eyes were lost.

Standish points out that the best results were obtained with the 10 per cent. solution of protargol, and that with argyrol a 50 per cent. solution gave no better results than one of half that strength. He concludes that the newer silver salts are safer and produce better results than the nitrate, besides being more easily applied. That with ophthalmia neonatorum either protargol or argyrol is satisfactory; but in the gonorrheal ophthalmia of the adult, when the cornea has become involved, protargol seemed to afford better results. He regards the application of cold in these cases as a dangerous procedure that should be abandoned.

Conjunctivitis Nodosa. In reporting a case of this disease in an inmate of a colored orphans' asylum, de Schweinitz and Shumway[2] have attempted to fix the caterpillar, the hairs of which caused the condition. The case was regarded as probably one of tuberculosis of the conjunctiva until, upon microscopic examination of the excised tissue, the hairs of the caterpillar were found embedded in the nodules. Dr. de Schweinitz visited the place where the injury occurred, at the same season the next year, and obtained three species of caterpillar. One of these, the spilosoma virginica, or yellow woolly bear caterpillar, the children were accustomed to throw at each other, and he believes this was the kind which caused the injury. Another form which he found, the empretia stimulea, or saddle back caterpillar, is known to be intensely irritating; but he found the children were aware of this, called it the nettle caterpillar, and never touched it.

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[1] Journal of the American Medical Association, December 17, 1904.

[2] Transactions of the American Ophthalmological Society, 1904, p. 237.

Two cases of foreign body embedded in the conjunctiva for a period of six months, and giving rise in each case to a yellow inflammatory nodule, are reported by Wurdemann.[1] In one case the foreign body was a bee sting; in the other a jointed, hairy substance from a grasshopper.

Pemphigus of the Conjunctiva. In cases reported by Salva[2] and Brown[3] the conjunctival lesions seems to have been the first to arouse suspicion of the grave condition impending. These early conjunctival manifestations were of the nature of conjunctivitis, which improved promptly under ordinary treatment; but upon close examination there was found a loss of epithelium, and the inflammatory attack was followed by a permanent contraction of the conjunctival sac. The movements of the lids probably prevent the formation of blebs upon the conjunctiva, their place being taken by the recurring erosions. These cases illustrate the powerlessness of any treatment to control the malady. The patients, who were past middle age, had vision gradually reduced to faint light perception before the fatal termination was reached.

DISEASES OF THE CORNEA.

Suppurating Ulcer. A case of ulcer with hypopion is reported by McNab,[4] in which the bacillus pyocyaneus seemed to be the pathogenic organism. This bacillus has been found in several reported cases of purulent inflammation of different parts of the eye. In this particular case cultures were made from the ulcer and the hypopion that accompanied it. As the organism became less virulent the extension of the ulcer ceased, and it rapidly healed. In the treatment of the case the Saemisch section of the cornea proved an effective remedy. In previously reported cases, three of which are quoted in abstract by McNab, the eye was lost by panophthalmitis.

Kipp[5] adds to the observations recorded in his earlier communication.[6]

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[1] Ophthalmic Record, February, 1905.

[2] La Clinique Ophtalmologique, July 25 and August 10, 1904

[3] Annals of Ophthalmology, July, 1904.

[4] Ophthalmic Review, March, 1904.

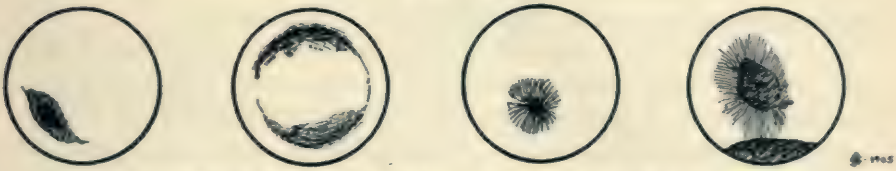
[5] Transactions of the Ophthalmological Society, 1904, p. 275.

[6] Progressive Medicine, June, 1903, p. 359.

If the ulcer were situated in the central part of the cornea, or the margin toward the centre, or were situated near the periphery, he has found that cases in which straight, diverging, grayish lines radiated from all parts of the margin of the ulcer, did well under simple treatment, such as boric acid fomentations, and instillations of atropine. When these grayish linear opacities were seen at a part of the margin of the ulcer, he resorted to simple treatment, and often found that they developed from all parts of the margin, and the farther progress of the ulcer was arrested. Kipp's observations remind us that corneal ulcer, like other diseases, may be self-limited. This fact, often overlooked, may account for the large number of plans of treatment for corneal ulcer that have found favor and advocacy in the last few years.

Under the name *infectious marginal ulcer* of the cornea, zur Nedden some years ago described a form of ulcer and a bacillus which he thought caused it, but which does not seem to produce lesions of the conjunctiva. He has now[1] reiterated his views, believing them confirmed by 43 cases, of which he gives sketches of the corneal lesions. Some typical forms from his collection are herewith reproduced.

FIG. 47.



Cases of infectious marginal ulcer of the cornea. (ZUR NEDDEN.)

It is notable that many of them show what may be taken to represent the gray, radiating lines described by Kipp. Although the ulcer may be accompanied by hypopion the prognosis is generally favorable. Zur Nedden usually treated these ulcers with atropine and a solution of mercury oxycyanide (1:5000), though sometimes the cautery or the Saemisch incision were resorted to.

For the *treatment of corneal ulcers* Gifford[2] regrets the tendency to speak slightingly of the Saemisch cut. For cases that are not desperate he scrapes the ulcer and applies one of the milder caustic acids. In this connection he speaks favorably of trichloracetic acid, used with just enough water to cause it to deliquesce. But for desperate cases he adds a cut through the floor of the ulcer, reopened every twelve hours, or kept open by cauterizing the edges, until the progress of the ulcer is surely stopped. He also recommends the Paquelin cautery, believing it penetrates more deeply than the galvanocautery often does. He suggests that the cheap apparatus used for pyrography answers the purpose admirably.

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[1] Graefe's Archiv f. Ophthalmologie, Bd. lix. p. 360.

[2] Ophthalmic Record, March, 1904.

For infected corneal ulcers, V. T. Churchman[1] has employed subconjunctival injections of formalin solutions. Commonly he used 20 minims of a 1:1000 solution. After touching the conjunctiva with cocaine to render it insensitive at the point of entrance, the needle is introduced 6 to 10 mm. back from the corneal margin, one-half of the amount is injected above the cornea, the needle shifted, and the reminder injected below the cornea. He reports 18 cases treated by this method, some of which had been doing very badly until it was resorted to. Improvement was prompt in all cases, and in only a few was a second injection necessary.

Dendritic Keratitis. From an extensive study of the literature, Charles[2] infers that dendritic keratitis is due to a terminal nerve lesion. He points out that it has been observed most frequently in diseases especially prone to attack the nervous system. The herpetic form, which is vesicular in the beginning, he considers the expression of a descending neuritis. A second form caused by malaria, la grippe, etc., papular in the beginning, may be due to a purely peripheral nerve lesion. It may be a result of degeneration of the terminal filaments of the corneal nerves.

Evidences of such an origin of dendritic keratitis are anæsthesia of the part, which is rarely absent, and the shape of the lesion, which resembles the arrangement of the nerve fibres in the subepithelial plexus. In the beginning the lesion is never deeper than Bowman's membrane, although later it extends sufficiently to leave a scar. In the malarial cases, in which quinine seems to hasten the recovery, this may be by checking the progress of degeneration before Bowman's membrane is injured. Any poison would be more likely to affect portions of the nerves farthest removed from the source of food supply.

Corneal Infiltration. Hot water has been applied in various ways in the treatment of corneal infiltrations, including the dropping of almost boiling water upon corneal ulcers. Manolesco[3] states that the dropping of very hot water into the conjunctival sac is the best treatment for parenchymatous keratitis, and deep corneal infiltration from other causes. After cocainization the water should be dropped in at a temperature of 70° to 80° C. (158° to 176° F.). Even somewhat hotter than this it will do no serious harm. It is to be dropped in for five or ten minutes. The application is followed by increased redness, which lasts for some hours.

Deposits of Silver and Lead. Weeks[4] reports a case of a deposit of silver in the cornea causing an almost black plaque, 5 mm. in diameter, having a metallic lustre. Its lower margin was bordered by an opaque, grayish, or yellowish-white border. The ocular conjunctiva was deeply injected, the eye painful, and vision reduced to perception of light. The patient had been given a solution of cocaine muriate to be instilled into the eye every two hours, this to be followed by instilling 1 or 2 drops of a 1 per cent. solution of silver nitrate. This was kept up for sixteen hours. Under the use of bichloride vaselin (1:5000) the plaque slowly diminished. A portion scraped away contained silver, probably in a finely divided metallic state. The eye became quiet, but an opacity remained reducing vision to counting fingers.

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[1] Transactions of the West Virginia State Medical Association, 1904.

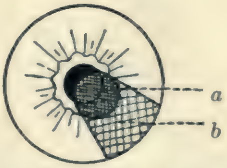
[2] American Journal of Ophthalmology, April, 1904.

[3] Annales d'Oculistique, March, 1904.

[4] New York Eye and Ear Infirmary Reports, January, 1904.

An extensive lead incrustation of the cornea is reported by Terson.[1] Iridectomy had been done for it, and tattooing of the cornea proposed. Terson removed the film by scraping, in three sittings, improving vision from $\frac{1}{10}$ to $\frac{1}{4}$.

FIG. 48.



Elschnig's method of cauterizing the cornea for keratoconus: *a*, deep cauterization of the apex; *b*, superficial burn extending to corneal margin.

Schiele[2] has succeeded in removing such an incrustation by changing the lead into a soluble salt. The film was first touched with a 3 per cent. to 5 per cent. solution of potassium iodide, then with a solution of equal strength of iodic acid. This causes the formation of nascent iodine, which attacks the insoluble lead salt, giving rise to a soluble compound, lead iodate. The irritation produced by the application also causes a leukocytosis which assists in the removal of the film.

Conical Cornea. It is pretty well agreed that the use of the cautery for extreme cases of conical cornea is the safest and most effective means of producing flattening of the apex of the cone. Repeated cauterization has been recommended, and this Scalinci[3] employs. He endeavors to burn more deeply at each cauterization; going on to perforation. He insists that the apex must be cauterized to get a permanent result.

Elschnig[4] reports that he can almost always succeed by one application in producing permanent flattening. He uses the cautery in the following way: The cautery is brought only to a dull red heat. It is applied to the apex of the cone and also to a strip of tissue extending from the apex to the nearest part of the sclerocorneal margin. This produces a band of vascular tissue extending to the apex of the cone and ensures the continued shrinking of the scar and flattening of the cornea. The apex of the cone is usually eccentric. If it were not so the scar should be made slightly eccentric to leave some clear cornea in front of the pupil.

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[1] Recueil d'ophtalmologie, December, 1904.

[2] Wochenschr. f. Therap. u. Hygiene des Auges, May 19, 1904.

[3] Annali di Ottalmologie, Bd. xxxiii. p. 81.

[4] American Journal of Ophthalmology, June, 1904.

DISEASES OF THE UVEAL TRACT.

Iritis: Size of Pupil. Contraction of the pupil is the symptom usually mentioned in text-book descriptions of iritis. Herbert[1] states that in his experience in India quite half the cases, presumably untreated by mydriatics, show a slight enlargement of the pupil, as compared with that of the unaffected fellow eye in distant fixation in ordinary daylight.

The enlargement seems to occur chiefly in severe cases when corneal irritation is absent. Slight corneal lesions are attended with contraction of the pupil which may persist until the iris is bound down in this position.

TREATMENT: SUBCONJUNCTIVAL AND TEMPORAL INJECTIONS. In the treatment of iritis, Roy[2] has employed injections under the conjunctiva and under the skin of the temple. He thinks they should be resorted to in all cases of severe iritis. For *rheumatic iritis* he used 7 centigrams (1 grain) of lithium salicylate, dissolved in 6 or 8 drops of sterilized water to which 4 mgm. ($\frac{1}{16}$ grain) of cocaine hydrochlorate was added to lessen the severe pain caused by the subconjunctival injection. For *syphilitic iritis* he used 6 to 8 drops of sublimate solution, 1:2000, with a similar addition of cocaine. After making the subconjunctival injection, if there were severe orbital pain a similar injection was made under the skin of the temple.

This treatment was not intended to replace internal medication and the local use of mydriatics, but by it Roy was able to control and relieve the pain of iritis within two or three days, the injection being repeated once daily. He reports a series of 4 cases of acute iritis none of which required more than two injections. In a case of chronic iritis, five injections were employed at intervals of eight to ten days, with excellent effect.

Foucher[3] used subconjunctival injections of sodium salicylate in three cases. He injected 6 drops of a 1 per cent. solution. In a fourth case, instead of making injections under the conjunctiva, he made it under the skin of the temple, and obtained an equally good result.

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[1] Ophthalmoscope, September, 1904.

[2] Annales d'oculistique, September, 1904, p. 206.

[3] L'ophtalmologie provinciale, August, 1904.

Gummatous Iritis. In gummatous iritis the breaking down of small gummata in the iris gives rise to yellowish débris that settles at the bottom of the anterior chamber, causing an appearance closely resembling hypopion. Rollet[1] reports two cases in which this form of iritis arose in six to nine months after the primary lesion. In such cases the prognosis seems to be distinctly favorable.

Krueckmann[2] has employed *kataphoresis* for the local application of mercury to the eye in gummatous iritis. He advises the employment of a current not exceeding 1½ milliamperes for daily sittings of twenty to forty minutes each. He has used in the mercurial solutions, sublamin 1:3000, or the succinimide of mercury 1:4000.

Tuberculous Iritis. The negative results with a new method of treatment have quite as much importance in fixing its true value as the positive. Heath[3] reports complete failure to check the course of iritic tuberculosis by weekly injections of air into the anterior chamber, as recommended by Koster.[4] It should be noted, however, that Heath's case was one of hopeless general tuberculosis rapidly approaching the fatal termination. Probably it is true of all forms of ocular tuberculosis, as was pointed out last year regarding conjunctival tuberculosis, that they improve or grow worse with the general condition of the patient.

The importance of constitutional treatment is emphasized by the observations of Meissonnier,[5] who points out that the tuberculosis may first affect the ciliary body and subsequently extend into the iris. He believes that uveal tuberculosis is always secondary.

Hunter[6] reports a case in which a child, with bad family history and unsanitary conditions of life, as might be expected, grew worse. Pollack[7] reported one of similar character terminating in enucleation for the pain. Abadie[8] takes a more favorable view, reporting two cases to sustain it; but he attaches great importance to internal treatment, including iodine preparations, cod-liver oil, guaiacol, and raw meat.

Radium for Uveitis. A case of severe relapsing uveitis, for which one eye had been enucleated and the second eye greatly improved under application of radium, is reported by Williams.[9] The exposures to the radium were made three times a week, with occasional intermissions of a week, up to the number of thirty. Practically no other treatment was used. Vision improved from counting fingers at ten feet to $\frac{5}{6}$. This single case would have less importance if the fact had not been rather frequently observed that the application of x-rays greatly relieved pain and favorably modified the course of uveal inflammations. I have seen a case of traumatic uveitis, that had persistently done badly under ordinary treatment, immediately improve after the application of the x-ray. Enucleation, which had previously been considered necessary, was not done, and the eye became painless, white, and quiet. It seems probable that the physiological and therapeutical effects of radium depend on the part of its radiations corresponding to the x-ray.

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[1] Revue générale d'ophtalmologie, October, 1904.

[2] Zeitschrift f. Augenheilkunde, January, 1904.

[3] Ophthalmic Record, May, 1904.

[4] PROGRESSIVE MEDICINE, June, 1903, p. 373.

[5] Archives d'ophtalmologie, July, 1904.

[6] New York Eye and Ear Infirmary Reports, 1904, p. 7.

[7] Glasgow Medical Journal, February, 1904.

[8] Archives d'ophtalmologie, March, 1904.

[9] Transactions of the American Ophthalmological Society, 1904, p. 269.

Central Superficial Choroiditis. A case of the so-called Tay's guttate choroiditis is reported by Schneideman.[1] This case began with a central relative scotoma. The ophthalmoscopic changes became decidedly noticeable in the region of the macula only after several months. At first there were slight swelling and a deeper color of the macula; later, yellowish-white plaques appeared in this region which remained permanent, although vision rose again to the normal standard.

Roosa[2] reports a case in which similar blurring of vision, with haziness of the vitreous, and subsequently spots of choroidal atrophy, occurred. The trouble began after ten hours' continuous reading of fine type. Vision remained reduced.

Panophthalmitis. A case of bilateral *metastatic panophthalmitis* is reported by Zobel,[3] in a patient suffering from a right-sided pneumonia. Two days after the crisis the left eye became inflamed, and three days later the right. The patient died. At the autopsy a suppurating bronchial gland was found to have broken into the right pulmonary vein, and metastases were found in other organs. Pneumococci were discovered in large numbers in the eyes, and pure cultures were obtained.

ALCOHOL COMPRESSES. Schiele[4] believes that he has greatly diminished the pain of panophthalmitis and lessened its duration by compresses soaked in absolute or 96 per cent. alcohol. These were renewed every twelve hours. At first the patients experienced a slight burning, but there was no excoriation of the skin. Phthisis bulbi was not prevented, but the eyes became quiet more quickly under this plan of treatment.

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[1] American Journal of Ophthalmology, January, 1905.

[2] Medical Record, February 20, 1904.

[3] Zeitschrift f. Augenheilkunde, January, 1904.

[4] Wiener medizinische Presse, September 18, 1904.

SYMPATHETIC DISEASE.

Sympathetic Amblyopia. Nuel,[1] from the prolonged observation of twenty cases, attempts to characterize this condition. He gives it a place between traumatic neuroses and true sympathetic ophthalmia. Momentary obscurations of vision are complained of many months after the injury to the exciting eye. Visual acuity is slightly diminished and narrowing of the visual field may be found. Sometimes a slight photophobia exists. Later the visual acuity fails and the visual field becomes decidedly narrowed. In bad cases slight changes may be noted in the optic disk and retinal veins. The exciting eye usually remains quiet. The disease does not go on to total blindness. Nuel advocates rest, smoked glasses, and mercurial inunctions. Enucleation of the exciting eye does not have the same good effect as in the other forms of sympathetic disease.

Sympathetic Inflammation. A new theory of sympathetic ophthalmia was suggested by Brown Pusey.[2] He took the observation that when one kidney was made to undergo degeneration by tying its ureter and vessels, the other kidney also underwent degenerative changes, which did not occur if the first kidney had been excised. From this he reasoned that cells in the ciliary region of an injured eye might produce toxins which passed through the circulation to corresponding cells in the other eye and set up a sympathetic uveitis.

Golovine[3] propounds much the same theory, extending its possible application to other than recognized sympathetic diseases. The theory is a very interesting and suggestive one, but the experiments so far made by both of its propounders seem to have yielded negative results. Motais[4] points out a possible channel for the transmission of sympathetic disease from the exciting to the sympathizing eye through the ophthalmic veins of the two sides, which are in full communication both anteriorly and posteriorly, and are not furnished with valves.

Leber,[5] reviewing the evidence of the connection of micro-organisms with sympathetic inflammation, inclines to the view that they pass to the sympathizing eye through the blood stream. But he brings forward no new or convincing evidence on the subject.

Sympathetic Ophthalmia following Panophthalmitis is reported by Ahlstroem.[6] The bacteriological examination of the sympathizing eye showed staphylococci in the vitreous, retina, and choroid, but not in the bloodvessels, optic nerve, or perineural space. Ahlstroem also reports a case of sympathetic ophthalmitis in which the sympathizing eye began to improve after a severe attack of African malarial fever. As enucleation had been promptly done, and as a relapse occurred after recovery from the fever, the share of the intercurrent disease in promoting a cure seems doubtful.

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[1] American Journal of Ophthalmology, July, 1904.

[2] Archives of Ophthalmology, July, 1903.

[3] Roussky Vratch, May 29, 1904.

[4] Transactions of the Tenth International Congress, Lucerne, 1904.

[5] Graefe's Archiv f. Ophthalmologie, Bd. lviii. p. 324.

[6] Centralblatt f. Augenheilkunde, July, 1904.

An interesting case of sympathetic inflammation following enucleation with implantation of a glass globe is reported by Sattler.[1] Recovery occurred after removal of the glass globe, and resection of the optic nerve trunk which was found embedded in dense cicatricial tissue.

DISEASES OF THE RETINA.

Hemorrhage. In searching for a cause for congenital amblyopia, Coburn[2] was led to study the eyes of 37 infants, stillborn or dying within twenty-two days after birth. Among these he found 17 that had suffered hemorrhage into the eye. In all cases the retina was the chief site of extravasation. Hemorrhage into the head of the optic nerve was noted 4 times; into the nerve sheath, 5 times; subretinal effusion, 3 times; subhyaloid, 4 times. The hemorrhages were most frequently found in the equatorial part of the eye.

Coburn points out that the proportion of cases of hemorrhage is probably not so large in children that survive, but he quotes from different authors who have examined the eyes of newborn children with the ophthalmoscope. In an aggregate of 673 cases hemorrhage was found in 127, or 20 per cent. Coburn points out how the conditions of labor favor the engorgement of all parts of the head, especially after the head has been born. Four-fifths of the eyes of newborn infants showed the vessels engorged, even where there had been no extravasation.

In the great mass of cases the blood is absorbed without leaving any trace, but it is quite possible for it to cause injury that would produce permanent amblyopia. The danger of retinal hemorrhage should be borne in mind and should influence the management of cases of labor. Probably cases of retinal hemorrhage from compression of the thorax, of which an example from compression between the buffers of cars, is reported by Scheer,[3] arise under much the same conditions as these birth hemorrhages.

Hemorrhage in Tape-worm Anæmia. In six cases of pernicious anæmia produced by *bothriocephalus latus,* Tschemolossow[4] found this a constant symptom. The hemorrhages occur in the nerve-fibre layer of the retina chiefly near the posterior pole of the eye. Visual acuteness is usually unaffected. The hemorrhage resembles that seen in pernicious anæmia.

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[1] Transactions of the American Ophthalmological Society, 1904, p. 337.

[2] Archives of Ophthalmology, May, 1904.

[3] Graefe's Archiv f. Ophthalmologie, Bd. lix. No. 2, p. 311

[4] Die ophthalm. Klinik., 1904, No. 10.

Diabetic Retinitis. A case in which retinal hemorrhage was the first symptom of diabetes mellitus is reported by Nagel.[1] The patient had an iridectomy made for acute glaucoma about a year before, showing no hemorrhagic tendency. Vision failing in the other eye, the ophthalmoscope revealed a number of small, roundish, pale-red, fresh retinal hemorrhages in the region of the posterior pole of the eye. There were no white spots in the retina. Examination of the urine then revealed 0.5 per cent. of sugar.

The prognostic and diagnostic significance of retinitis in diabetes is discussed by Nettleship.[2] He bases his conclusions on 48 cases. The patients ranged from forty-one to seventy-nine years, and 38 were known to have died—9 in the first year, 11 in the second year, and 18 between two and eight years after the discovery of the retinitis. Ten were known to have been living two years after such discovery, and 6 at periods of six to ten years afterward. The prognosis, therefore, differs widely from that of renal retinitis, since two-thirds of the patients were living two years after the retinal lesion was observed. Nettleship thinks that over half of these patients die of diabetes apart from any accompanying renal lesions. The character of the retinal lesions is less uniform in diabetes than in chronic nephritis; still they are of much assistance in diagnosis. The retinal degeneration may go on even though the general condition of the patient improves. The prognosis of improvement of vision, therefore, should be very guarded.

Renal Retinitis. The pathological anatomy of renal retinitis has been studied in 5 cases by Opin and Rochon-Duvigneaud.[3] They found the retinal lesions localized chiefly at the posterior pole of the eye, and to consist principally of œdema, hemorrhage, and fibrinous infiltration. The essential retinal structures were seldom destroyed. They found vascular changes more frequent in the choroid than in the retina. Except the heart and kidneys, other organs were unaffected.

Bichelonne[4] reports as albuminuric a case of neuroretinitis due to a chill followed by excessive use of the eyes in working upon annual accounts for two days and two nights. The patient had complained of lumbar pain some weeks before this. Traces of albumin were found in a few specimens of urine, but most examinations of the urine showed none. The retinal lesions were not those characteristic of renal retinitis. The patient had between 2 D. and 3 D. of hyperopia. The case seems to illustrate the fact that eye-strain neuroretinitis may be mistaken for that due to renal disease. It may serve also as a reminder that the more acute forms of renal retinitis are often largely due to eye-strain, and may greatly improve after the removal of that factor.

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[1] Ophthalmic Record, October, 1904.

[2] Royal London Ophthalmic Hospital Reports, vol. xvi. No 1, p. 11.

[3] Archives d'ophtalmologie, March, 1904.

[4] Annales d'oculistique, December, 1904.

DISEASES OF THE OPTIC NERVES, TRACTS AND CENTRES.

Optic Neuritis: Pseudoneuritis. In certain cases it is difficult or impossible to say on first examination whether the ophthalmoscopic appearances indicate optic neuritis, or merely an anomaly of the nerve head. Pick[1] divides these cases into pseudoneuritis and œdema. The diagnostic points to which he calls attention are: transparency of the tissue, the normal reflex from the vessels, the permanence of tortuosity of the vessels, and the refraction. I would emphasize the permanence of the appearances when not due to optic neuritis and the absence of the "choking" of the retinal vessels—that is, narrowing of the arteries and enlargement of the veins. Pick points out that when the hyperæmia of some infectious fever is added to the usual appearances of pseudoneuritis, the diagnosis becomes still more difficult. Only time, revealing the changes of optic neuritis or the absence of such changes, can make it certain.

The differentiation of pseudoneuritis is of greater importance because true optic neuritis does occur with the acute infectious fevers. Flatau[2] reports a case of paratyphoid with optic neuritis. Carpenter[3] reports two cases of optic papillitis occurring with enteric fever in children seven and eleven years of age.

Bichelonne[4] reports one of angina followed by double optic neuritis, and Bar[5] a case of optic neuritis with polyneuritis occurring during pregnancy. Fergus[6] met a case of optic neuritis following smallpox.

Regarding *blindness from optic neuritis*, Barrett[7] finds that in non-syphilitic cases, and even in many syphilitic cases, blindness will result, if the case be allowed to run its course. He believes that a simple opening in the skull gives better prospect of saving vision and relieving pain than any form of medical treatment, and that we should not wait until vision begins to fail before resorting to this.

Optic Atrophy following Severe Hemorrhage. The amaurosis which sometimes follows severe hemorrhage seems to be due to atrophy of the

[1] Zeitschrift f. Augenheilkunde, March, 1904.

[2] Münch. med. Wochenschrift, July 5, 1904.

[3] The Ophthalmoscope, February, 1904.

[4] Annales d'oculistique, November, 1904.

[5] Bulletin de la societe d'obst., Paris, 1904, p. 180.

[6] Ophthalmic Review, July, 1904.

[7] Intercolonial Medical Journal of Australasia, 1904, vol. ix. pp. 249–258

optic nerves. Sweet[1] reported its occurrence in a previously healthy man of fifty-five years following severe intestinal hemorrhage. Stirling[2] reports one following hemorrhage from extraction of a tooth in a boy less than four years of age, who was evidently a "bleeder." In some of these cases the blindness is temporary. In many of them there is subsequently a little improvement; but optic atrophy becomes evident, and after that not very much can be done for them. The improvement of vision usually begins from three to six days after the occurrence of the hemorrhage.

Terson has urged the early treatment of these cases by large injections of saline solution, or of some artificial serum. He reports[3] a case of syncope from post-partum hemorrhage. The patient on regaining consciousness found herself blind. The physician in attendance gave a large saline injection, and vision was permanently restored.

Optic Atrophy and Cranial Deformity. Oxycephaly, or "tower skull," is a deformity which arises through early union along some of the sutures, leading to excessive height of the calvarium above the auditory meatus. It is apt to be attended by post-neuritic, or primary optic atrophy. Morax and Patry[4] report 7 cases, 6 of them from one institution for the blind containing 200 inmates. The blindness was not congenital, but began usually before the age of five years, although one patient was nine years old. In most cases the general intelligence was fair or good.

Enslin[5] has collected altogether 28 cases, 26 having been reported by others, not including the series above referred to. In most cases the optic atrophy was post-neuritic, although in a few it seems to have been a primary gray atrophy. The 3 cases examined post-mortem all showed narrowing of the optic foramen.

Enslin thinks that the osseous changes in this region are the cause of an optic neuritis, rejecting the suggestion of Hirschberg that this might be due to meningitis. The neuritis has usually passed into atrophy before the patient is seen; because, until atrophy begins, vision remains good and attention is not directed to the eyes.

Diseases of the Optic Chiasm. These have received special attention in the literature of the past year, notable articles having been published by Wilbrand and Saenger,[6] de Schweinitz and Carpenter,[7] and Gehrung.[8] The latter gives, by brief abstract and table, 102 cases that he has collected, most of them from the literature. He finds that disease of the chiasm may be due to acromegaly, syphilis, tuberculosis, meningitis, sarcoma of various kinds, carcinoma, endothelioma, enchondroma, adenoma, glioma, aneurysm, cysts, fracture of the skull, ascending neuritis, hemorrhage, and hypertrophy of the pituitary body. From the comparatively small number of reported cases he infers either that the chiasm is not a favorable site for lesions in these various diseases, or that many cases go unrecognized. De Schweintz and Carpenter also call attention to lesions of the chiasm occuring with multiple sclerosis and tabes.

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[1] Transactions of the American Ophthalmological Society, 1903.

[2] Ophthalmic Review, August, 1904.

[3] Recueil d'ophtalmologie, July, 1903.

[4] Ibid., August, 1904, p. 480

[5] Graefe's Archiv f. Ophthalmologie, Bd. lviii. Heft 1, p. 151.

[6] Die neurologie des Auges, Bd. iii.

[7] Journal of the American Medical Association, January 14, 1905.

[8] New York Eye and Ear Infirmary Reports, 1904.

The most important ocular symptoms of chiasm disease are the changes in the visual field. Bitemporal hæmianopsia, from destruction of the fibres which cross at the chiasm is the most characteristic, but cases in which the lesion is exactly limited to these fibres are very rare. Generally it encroaches either upon one tract, causing homonymous defect of the fields in both eyes; or upon one nerve, causing greater impairment of the field in one eye. More extensive disease involving both the direct and decussating tracts at the chiasm may cause complete blindness in both eyes.

It is to be noted that in bitemporal hemianopsia the division between the blind and seeing halves of the fields is found, as in homonymous hemianopsia, to pass slightly toward the blind side, leaving the fixation point fairly within the seeing field. Anomalous disturbances of the visual field, such as loss of the temporal color fields, central scotoma, sector defects, and even homonymous and nasal hemianopsias, are also reported as due to disease of the chiasm.

For the differential diagnosis of chiasm disease it must be remembered that, as de Schweinitz and Carpenter point out, these disorders of the field of vision may be simulated by hysterical hemianopsia, by the effects of brain tumor situated at a distance from the chiasm, by irregular contraction, involving chiefly the temporal fields in tabetic atrophy of the optic nerve, and possibly by some of the toxic amblyopias.

The ophthalmoscopic symptoms of chiasm disease include optic neuritis and optic atrophy. The atrophy may be primary, or it may be postneuritic. It may involve only the temporal half of the nerve entrance. Loss of reaction of the pupil to light thrown upon the blind half of the retina, which theoretically should be common, has been noted in a few cases.

Congenital Word Blindness. While little has been added to the clinical picture of this condition drawn by Hinshelwood and Nettleship,[1] additional cases have been reported from different parts of the world, until, including new cases within the last year by Hinshelwood[2] and Brunner,[3] and 2 which I have reported in a paper read before the Denver Academy of Medicine, 19 cases are now on record.

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[1] PROGRESSIVE MEDICINE, June, 1902, p. 381.

[2] The Ophthalmoscope, October, 1904.

[3] Ophthalmology, January, 1905

The influence of sex is shown by the proportion, 15 boys to 4 girls. So far only two patients are known to have reached adult life without acquiring moderate ability to read. The defect seems to some extent to be merely a delayed development and probably the lower degrees of it are not uncommon. Whether, as has been supposed, it is always due to absence or deficiency of a centre for the visual memory of letters and words, a centre usually situated in the left angular gyrus, seems still uncertain. The difficulty of reading may extend to the reading of numerals, or this may be quite perfect.

Recognition of the condition would be difficult in children with inferior general intelligence or imperfect vision. So far all recorded cases have been recognized by ophthalmologists to whom they were brought on the supposition that the difficulty was really a defect of vision, but in every case the vision proved to be fully up to the normal standard.

TOXIC AMBLYOPIAS.

Methyl-Alcohol Amblyopia. The importance of methyl-alcohol poisoning is as yet imperfectly recognized by the medical profession and the public. Cases of blindness from this cause may now usually reach a correct diagnosis. The clinical history[1] of sudden blindness followed by marked improvement and subsequent relapse, is so striking and characteristic, and after reaching blindness the patients are so likely to consult a number of specialists, that probably few cases of amblyopia from this cause pass unrecognized. Cases that end in death, and so are subjected to judicial investigation, are also frequently traced to the proper source; but it is to be feared that the great mass of cases which do not result in death or permanent blindness are still ascribed to other causes.

Buller and Wood[2] have attempted to collect both reported and hitherto unreported cases. They have thus brought together 153 instances of blindness and 122 deaths from methyl-alcohol occurring within the last few years. These do not include the somewhat sensational revelations in New York, where 25 deaths were traced to the drinking of wood-alcohol from one saloon.

The extent of the danger from this cause is indicated by quotations from health officers. Thus, in the opinion of Dr. Wylie, of the Government Bureau of Chemistry, "85 per cent. of the whiskey sold in this country in hotels, restaurants, clubs, and bars is nothing less than a cheap imitation." Dr. Warren, Pure Food Commissioner of Pennsylvania, states that of 1000 samples of cheap whiskey 95 per cent. contained wood-alcohol, some as high a proportion as 75 per cent. The drinking of this drug either as cheap whiskey, or as one of the cheap extracts, is actually coming to be one of the more serious causes of blindness, and until a wider appreciation of its danger is brought about, and radical measures are taken to prevent the drinking of this poison, the proportion of blindness due to this cause will certainly increase.

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[1] Progressive Medicine, June, 1903, p 390.

[2] Journal of the American Medical Association, October 1, 1904.

Tobacco Amblyopia. The characteristic symptom of tobacco amblyopia is the central scotoma, and usually no other impairment of the visual field is thought of in connection with it. Other abnormalities have been noticed, and Harman[1] believes they are quite constant. He studied his cases by taking the fields of vision first in a fully-lighted room, and then taking the field for white by a comparatively feeble illumination. By this means he discovered peripheral narrowing and impaired vision throughout the whole extent of the field. In 4 cases, followed to recovery, enlargement of the fields coincided with improvement of central vision, and in relapses diminution of the field accompanied diminished visual acuity.

Pathology of Toxic Amblyopias. In an experimental study of the nature of *quinine amblyopia,* Altland[2] found changes in the retinal ganglion cells in animals killed during quinine intoxication even when there were no ophthalmoscopic changes and no evidences of impaired vision. If visual impairment and ophthalmoscopic changes (pallor of the disk and narrowing of the arteries) were produced the alterations in the ganglion cells were much greater. The bloodvessel walls exhibited no anatomical changes. Altland believes that the amblyopia is due to the direct action of the quinine on the ganglion cells, although their necrosis may be hastened by the diminution of the blood supply.

Birch-Hirschfeld[3] argues at length against the view of Schieck that the *amblyopia produced by ethyl-alcohol* depends primarily upon disease of the vessels of the optic nerve, the diminished blood supply being most severely felt by the centrally situated fibres. He points out that the vascular alterations are far from constant, and argues that in the absence of anatomical studies of early amblyopia from ethyl-alcohol, weight should be given to the observed early results of poisoning by methyl-alcohol. Birch-Hirschfeld holds out that the direct influence of the toxic agent upon the optic nerve fibres and ganglion cells cannot be disproved, although he does not deny that changes may occur in the bloodvessels of the optic nerve, and may possess a certain significance.

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[1] Lancet, October 1, 1904.

[2] Klinische Monatsbl. f. Augenheilkunde, July–August, 1904.

[3] The Ophthalmoscope, March, 1904

DISEASES OF THE CRYSTALLINE LENS.

Causation of Cataract. Attention is called by Calhoun[1] to the association of *cataract with uncinariasis.* He gives 5 cases seen within one year which strikingly illustrate this connection, and he remembers others of the kind encountered before his attention was called to the subject. The ages of his patients were suggestive of some unusual cause for cataract. They were fourteen, sixteen, forty, forty-two and forty-three years. The cataract was in every case bilateral and had developed from several months to a year after the appearance of symptoms of uncinariasis. Every examination of the feces showed the eggs of the hook-worm. This disease seems to be quite common in our Southern States, being frequently confused with malaria. Other evidences of its tendency to cause cataract should soon be forthcoming.

Influence of Osmosis on Cataract. The urine of 80 patients suffering from cataract in Parisotti's clinic has been studied by Grilli[2] by the method of *cryoscopy.* He found the osmotic tension low, averaging 1.10, while that of a number of healthy persons averaged —1.65. This approach of the freezing point of the urine toward that of distilled water indicates deficient elimination. Grilli thinks this due to what has been called "senile kidney," probably caused by arteriosclerosis affecting the kidney, although other parts of the arterial system may show little evidence of such a change. The effect of deficient elimination is probably an increased osmotic tension in the fluids surrounding the crystalline lens—the aqueous and vitreous humors—which tends to withdraw water from the lens and produce opacity. Grilli[3] reports from the clinics of Galezowski and Landolt 3 cases of cataract in patients aged forty-two, forty and forty-six years, who were suffering from chronic lead-poisoning. In these patients also the osmotic tension of the urine was low, —1.02, —1.13, —1.20.

Brown Pusey[4] studied the possible effect of osmotic disturbances in causing glaucoma by suspension of the eye in fluids (sodium chloride solutions or alcohol dilutions) having different osmotic tensions. He observed that a solution with a high osmotic tension caused the lens to become opaque, in from one and a half to two and a half hours; but upon leaving the lens in distilled water or a solution of low osmotic tension for some hours it again became clear.

For some years I have told patients suffering from incipient senile cataract that to favor elimination by drinking freely of water, and to avoid eye-strain, were the most important things they could do to check or prevent the development of cataract. In many cases there has been no further increase of the opacity, and in several cases there has been partial clearing of the lens.

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[1] Ophthalmic Record, April, 1904.

[2] Recueil d'ophtalmologie, June, 1904.

[3] Ibid., October, 1904.

[4] Archives of Ophthalmology, March, 1904.

Salffner[1] found that in experimental naphthalin cataract produced in dogs the weight and the volume of the crystalline lens were both reduced, while its specific gravity was increased. Peters[2] found in naphthalin cataract an increased proportion of salts and increased osmotic tension in the aqueous humor.

GLAUCOMA.

Medical Treatment. The unwillingness of patients to submit to the most effective treatment for glaucoma, iridectomy, leaves many cases to be met as best they can by other measures. Cantonnet[3] has used *sodium chloride internally* to increase elimination. After careful estimation of the chlorides excreted, the patient was given 3 grams daily, and the dose increased, sometimes to 15 grams per day. When the amount of chlorides excreted increased about as much as the amount given, and polyuria was produced, the treatment was considered appropriate. In 17 cases thus treated the effect was reported excellent in 6, and good in 6 others; in 3 the results were distinctly bad. If renal elimination be defective this treatment should be avoided.

Bessonnet[4] reports a trial of *strophanthus* for glaucoma, as recommended by Zimmermann. In 2 cases presenting the "prodromes of glaucoma" decided improvement was experienced. In 6 cases treated with myotics and strophanthus there was notable improvement for two or three weeks. In one case the disease seemed to be seriously aggravated. Bessonnet concludes that this treatment is not suited to all cases, but may be of benefit to some.

Darier,[5] in a case where one eye had been lost by hemorrhage complicating iridectomy, used subconjunctival injections of sodium iodate solution, 1:1000. The tension of the eye was promptly reduced, but contraction of the visual field still continued.

Sympathectomy. Loring[6] has collected the reported cases of simple glaucoma for which this operation has been done. He finds 41 eyes (33 patients), of which 29 eyes were improved for three months or more, but only 8 eyes had been under observation so long as one year and none more than two years. He concludes that for glaucoma simplex sympathectomy is justifiable and ought to be more often tried, when the disease continues to progress in spite of other measures.

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[1] Graefe's Archiv f. Ophthalmologie, Bd. lix. Heft 3, p. 520.

[2] Klinische Monatsbl. f. Augenheilkunde, July–August, 1904.

[3] Archives d'ophtalmologie, January, 1904.

[4] Recueil d'ophtalmologie, August, 1904.

[5] Ibid , December, 1904

[6] Archives of Ophthalmology, September, 1904.

Henderson[1] reports 2 cases of bilateral glaucoma subjected to bilateral sympathectomy. The course of the disease was permanently checked, in one for over four years, in the other for five months. He concludes that the operation should be done for simple chronic glaucoma as soon as possible after the diagnosis is made, and that "both superior cervical ganglions should be removed at the same time." He points out that of Loring's cases 12 had bilateral sympathectomy, and that in these patients 18 eyes improved after the operation, without reported relapse; while 4 improved, but subsequently relapsed.

Bilateral sympathectomy is apparently as free from injurious effects as unilateral. In view of the extremely intimate relations between the sympathetic nerves of the two sides a unilateral operation may be regarded as a partial or incomplete operation. And in view of the indications furnished by the limited clinical experience yet at our disposal, I believe it is proper in all cases where sympathectomy is advised to urge that the superior ganglion be removed on both sides.

OCULAR DISEASE WITH DENTAL DISEASE.

Reber[2] classifies the cases falling under this heading into (1) purely functional; (2) functional inflammatory (ocular inflammation from dental irritation); (3) inflammatory; (4) dental neuralgia due to ocular anomalies or disease. In the first class the most common condition is impairment of the accommodation. Cases of reflex amaurosis have also been reported. Under this heading Reber reports a case in which blurring of vision, dilatation of the pupil, and failure of its reaction to light followed the extraction of an upper bicuspid tooth. Other evidences of traumatic hysteria developed. In the second group are classed cases of glaucoma, neuroparalytic keratitis and uveal inflammations, apparently due to dental irritation and relieved by its removal. In the third group are placed those not very rare cases in which alveolar inflammation extends (often by the antrum of Highmore) to the walls or contents of the orbit. In his fourth group Reber mentions the pain of iritis felt as a toothache. But the larger number of cases are those in which the toothache seems to be set up by eye-strain, from ametropia, excessive near work for the eyes, or exophoria with near work.

Nance[3] reports cases of asthenopia due to an unhealthy cavity in an upper molar, supraorbital neuralgia, loss of accommodation and hyperæmia of the eye from diseased upper teeth; and one of inflammation extending from the socket of a decayed upper molar and causing orbital abscess.

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[1] Annals of Ophthalmology, January, 1905. [2] Ophthalmology, October, 1904

[3] Journal of the American Medical Association, April 2, 1904.

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PROGRESSIVE MEDICINE.

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES.

EDITED BY

HOBART AMORY HARE, M.D.,

PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA; PHYSICIAN TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL; ONE TIME CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA; MEMBER OF THE ASSOCIATION OF AMERICAN PHYSICIANS, ETC.

ASSISTED BY

H. R. M. LANDIS, M.D.,

VISITING PHYSICIAN TO THE TUBERCULOSIS DEPARTMENT OF THE PHILADELPHIA HOSPITAL, TO THE WHITE HAVEN SANATORIUM AND TO THE PHIPPS INSTITUTE; DEMONSTRATOR OF CLINICAL MEDICINE IN THE JEFFERSON MEDICAL COLLEGE.

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LIST OF CONTRIBUTORS.

WILLIAM T. BELFIELD, M.D.,

Associate Professor of Surgery in the Rush Medical College; Professor of Genito-urinary and Venereal Diseases in the Chicago Polyclinic, Chicago.

JOSEPH C. BLOODGOOD, M.D.,

Associate in Surgery, Johns Hopkins University, Baltimore, Md.

JOHN ROSE BRADFORD, M.D., F.R.C.P., F.R.S.,

Professor of Medicine and Physician to the University College Hospital, London.

JOHN G. CLARK, M.D.,

Professor of Gynecology in the University of Pennsylvania, Philadelphia.

WILLIAM B. COLEY, M.D.,

Attending Surgeon to the General Memorial Hospital; Associate Surgeon to the Hospital for Ruptured and Crippled; Clinical Lecturer in Surgery and Instructor in Surgery at the College of Physicians and Surgeons, Columbia University, New York.

FLOYD M. CRANDALL, M.D.,

Adjunct Professor of Pediatrics, New York Polyclinic Hospital; Visiting Physician to the Minturn Hospital for Scarlet Fever and Diphtheria; Consulting Physician to the Infants' and Children's Hospitals, New York.

WILLIAM EWART, M.D., F.R.C.P.,

Physician to and Joint Lecturer on Medicine at St. George's Hospital, and Physician to the Belgrave Hospital for Children, London.

EDWARD MILTON FOOTE, M.D.,

Instructor in Surgery, Columbia University; Visiting Surgeon, New York City Hospital.

CHARLES H. FRAZIER, M.D.,

Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, Howard, and Philadelphia Hospitals.

WILLIAM S. GOTTHEIL, M.D.,

Professor of Dermatology and Syphilology, New York School of Clinical Medicine; Consulting Dermatologist to the Sheltering Guardian Orphan Asylum; Dermatologist to the Lebanon and Beth Israel Hospital, and to the German West Side Dispensary, New York.

CHARLES PREVOST GRAYSON, A.M., M.D.,

Lecturer on Laryngology and Rhinology in the Medical Department of the University of Pennsylvania; Physician-in-Charge of the Department for Diseases of the Throat and Nose in the Hospital of the University of Pennsylvania ; Laryngologist and Otologist to the Philadelphia Hospital.

EDWARD JACKSON, M.D.,

Emeritus Professor of Ophthalmology in the Philadelphia Polyclinic.

H. R. M. LANDIS, M.D.,

Visiting Physician to the Tuberculosis Department of the Philadelphia Hospital, to the White Haven Sanatorium and to the Phipps Institute ; Demonstrator of Clinical Medicine in the Jefferson Medical College.

RICHARD C. NORRIS, M.D.,

Assistant Professor of Obstetrics in the Medical Department of the University of Pennsylvania, Philadelphia; Physician-in-Charge of Preston Retreat.

ROBERT B. PREBLE, A.B., M.D.,

Professor of Medicine in Northwestern University Medical School; Attending Physician to Cook County, St. Luke's, Wesley, German, and Polyclinic Hospitals, etc., Chicago.

ROBERT L. RANDOLPH, M.D.,

Associate Professor of Ophthalmology and Otology in Johns Hopkins University, and Associate Ophthalmic and Aural Surgeon to Johns Hopkins Hospital, Baltimore, Md.

WILLIAM G. SPILLER, M.D.,

Professor of Neuropathology and Associate Professor of Neurology in the University of Pennsylvania ; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania and in the Philadelphia Polyclinic.

J. DUTTON STEELE, M.D.,

Associate in Medicine, University of Pennsylvania.

ALFRED STENGEL, M.D.,

Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia.

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PROGRESSIVE MEDICINE.

SEPTEMBER, 1905.

DISEASES OF THE THORAX AND ITS VISCERA, INCLUDING THE HEART, LUNGS AND BLOODVESSELS.

BY WILLIAM EWART, M.D., F.R.C.P.

TUBERCULOSIS.

THE study of tuberculosis is receiving the unabated attention of pathologists all over the world. In the United States valuable work, under the guidance of Lawrence F. Flick, is published in the first volume of *Reports from the Henry Phipps Institute* and in the volume of *Studies from the Saranac Laboratory*, 1900–1904, under the directorship of E. L. Trudeau. An important place is devoted to the study of the tuberculin reaction, and of the temperature reaction, and the local reactions sometimes resulting from the injection of trypsin, peptone, and sodium cinnamate.

The two aspects of the tuberculosis crusade, suppression of the infecting agents and protection against infection, have been eloquently preached in every part of the world in all their details and do not belong to the scope of these pages. It is held by many, as by A. G. R. Foulerton,[1] that the larger preventive measure is not so much the building of sanatoria and the attempt at isolating the ubiquitous microbe, as the more vigorous exercise of the provisions of the public health acts. The special fields for antitubercle hygiene are the unhealthy homes, the overcrowded and ill-ventilated schools, workshops, offices, and public rooms of all kinds. The difficulty is how to apply the precepts so abundantly taught. Private and public apathy have to be overcome, as pointed out by C. W. Brasher,[2] in his remarks on the "Segregation of the Tuberculous among Factory Workers."

[1] Lancet, November 26, 1904, p. 1513.

[2] British Medical Journal, August 27, 1904.

The present state of the antituberculosis propaganda in the United States furnishes Knopf[1] with important suggestions for a more effectual co-operation of authorities, philanthropists, physicians, and laymen. An essential agency is that of the family physician. Knopf points out the invaluable services which he can render as a teacher, hygienist, and "prophylactiker," in addition to his care of the patients.

The hunt for tuberculosis must come to be the practical physician's daily occupation. His duty is clearly set out by Grancher, "Il faut qu'il prenne l'offensive." Not enough that he should treat the patient, he should also take into his protection those who surround the invalid, and detect the disease in its earliest form. This work, "avant tout une œuvre de bonte," and one from which the profession will not recoil.

The economics of tuberculosis is another great department of study, some of the lines of which are indicated by John B. Huber.[2]

Notice is also claimed for Marshall Langton Price's[3] elaborate investigation of the "Economic Course of Consumption in Wage-earners," illustrated by diagrams and tables. He concludes with the statement that it is possible to determine accurately, among many losses, the personal loss falling upon the individual, and from this the potential loss caused by his elimination from the field of production.

Prevention. Although the supply of more sanatoria and of more dispensaries is a necessity of the day, as is also the *notification of tuberculosis,* yet there is great force in the argument that prevention by improvement of the race is more important than the cure or the notification of individual cases, and that any public expenditure devoted to efficient measures for raising the level of public health would be more productive than any other.

Active, nay, aggressive, prevention is the logical development of the already accepted obligation of passive prevention or protection. S. A. Knopf[4] directs our special attention to the question "How the public school may be helpful in the prevention of tuberculosis?" And the same helpful notion finds an obvious opportunity in many other institutions—almost in all the aggregations of possibly tuberculized subjects, except, perhaps, in prisons and in lunatic asylums, where our good teachings might be largely thrown away.

The growing recognition of the importance of preventive measures applicable to early life is shown by the lectures and public addresses which have been delivered on that subject, and by the foundation of various institutions on the lines of "L'Œuvre des Enfants Tuberculeux."[5]

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[1] Journal of the American Medical Association, February 11, 1905.

[2] New York and Philadelphia Medical Journal, October 8, 1904.

[3] Journal of the American Medical Association, April 15, 1905.

[4] New York and Philadelphia Medical Journal, September 3, 1904.

[5] Lancet, March 11, 1905.

Much is being done, too, for the welfare of juvenile sufferers from surgical tuberculosis, as set forth by Sir William Broadbent,[1] and strongly advocated by Tubby.

All must agree with E. Dean Marriott[2] that no money expended in measures of preventive sanitation and education will ever fail to bring in its full return, although the vast majority will sympathize with the cry for more sanatoria to enable the victims in our generation to be relieved, even for shortened periods, and to utilize them, as long ago suggested by Arthur Newsholme, as "antitubercle schools." But there is a more economical and further reaching system, the dispensary system, now beginning to spread, and actively pushed in Paris by Robin and Grancher. As to the teaching of hygiene, it should be made compulsory in the curriculum of all our elementary schools.

The Etiology of Tuberculosis. Of the five channels of infection discussed in his Weber-Parkes' prize essay, in addition to the rare but not impossible transmission by the ovum, Hugh Walsham[3] finds that most frequently active are the lymphatics (including the tonsils), the blood-vessels, and the epithelial surfaces. The essay confirms most of our previously accepted etiological facts.

TUBERCLE IN THE ŒSOPHAGUS appears to have been noted by Krauss as a result of a lesion with subsequent infection from sputum, and by Zenker and Cordua at the periphery of a cancerous ulceration.

L. Rocher's[4] case occurred in a girl suffering from an œsophageal stenosis after swallowing caustic. During her treatment in the hospital she acquired pulmonary tuberculosis, and at the autopsy the presence of an œsophageal tuberculosis was revealed.

IS THE CHEST OR THE ABDOMEN THE CHIEF SITE of the primary tuberculous invasion in children? Upon this question, the importance of which is not restricted to child life, since the pulmonary tuberculosis of adults is often to be attributed to the existence of ancient caseous foci, we have now the reports of various careful observers. The latest utterance, that of W. P. S. Branson,[5] deals with relatively few but with thoroughly investigated cases, and the following results from an examination for every local trace of tubercle in 138 complete autopsies are a reliable basis:

Among the 138 bodies there existed signs of tuberculosis—active or obsolete—in 43. The primary lesions were distributed as follows:

Primary in bronchial glands or lung	22 or 51. per cent.
Primary in intestines or mesenteric glands . .	9 or 20.9 " "
Primary in petrous bone	1
Doubtful	11 or 25.0 " "

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[1] British Medical Journal, April 22, 1905. [2] Ibid., January 21, 1905.

[3] The Channels of Infection in Tuberculosis, London, 1904.

[4] Rev. Internat. de la Tuber., 1905, p. 202.

[5] British Medical Journal, January 14, 1905.

Branson's conclusions are to the effect that:

1. Among the children of the poor in London tuberculosis is absolutely most fatal during the first two years of life, but, relatively to all other causes of death, becomes progressively more fatal until the fourth year. 2. There is no specific relationship between measles and whooping-cough on the one hand and tuberculosis on the other. 3. Catarrhal lesions of mucous membranes are the paramount predisposing causes of tuberculosis in early life, and that measles and whooping-cough are potent in this regard only through the catarrhs accompanying them. 4. About 50 per cent. of children dying of tuberculosis have had neither measles nor whooping-cough. 5. While the infection of tuberculosis in childhood is mostly air-borne, primary infection of the abdomen is by no means a rarity.

It is remarkable that two other good observers working at the same hospital should have previously arrived at different figures as to the frequency of abdominal tuberculosis. Batten recording a percentage of 15, and Still of 23.4, while Price Jones, dealing with a smaller series, finds a percentage of 28.5.

The recognition by Branson that primary abdominal tuberculosis is not a rarity, as some would consider it to be, does not alter the fact of the preponderance of the pulmonary form of invasion, nor invalidate general conclusions that catarrhal lesions of whatever origin are the determining factor of tuberculosis in early life, and that the danger resides in them rather than in any specific infection, such as whooping-cough or measles, that may excite them. As a comment, let us add that the same etiology fits many cases of invasion at a later period, and that the treatment of catarrh which so often receives little attention is at all ages, but preeminently in infancy, a most urgent duty.

L. Kingsford[1] deals with the same subject by analyzing the postmortem records of 339 cases of all ages up to fourteen years (48 per cent. occurring during the first two years, and 80 per cent. during the first five years) from the East London Hospital for Children. Without attempting to follow Kingsford's important elaborations, we note that he ascribes to inhalation 63.7 per cent. of the cases, and to ingestion 19.1 per cent., leaving a doubtful residue of 17 per cent.

We cannot fail to recognize the general agreement between these various results, in spite of differences between the methods; and we may, for clinical purposes, adopt with considerable confidence the view that, while contamination of the milk or food must account for a good number of the cases of intestinal origin, the majority of the victims succumb to air-borne infection under the predisposing influence of catarrh. Bad air and all forms of catarrh, then, are the chief risks against which infant life claims our protection. Fortunately, in both directions a great deal is already being done, and much more is within the bounds of our possibilities.

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[1] Lancet, September 24, 1904.

At the same time, we should not forget that the great mortality from infantile gastroenteritis sweeps away prematurely a large proportion of those most predisposed to the abdominal form of tuberculosis, and that alimentary infection is probably more active than would appear from the foregoing returns. This is a reservation which entails upon us unrelaxing attention to the purity of the supplies, as well as to the much needed improvement in our methods of treating delicacy of the intestinal mucous membrane.

DUST INFECTION may be answerable for various morbid symptoms and for some of our diseases. Nevertheless, it must be owned that, in the case of dust, as in that of many other risks and discomforts, it is remarkable how much the strong healthy individual can stand. Mechanically, we are less vulnerable to dust than the insects, and less liable to be smothered. The other effect is the toxic, of which we know much less, but in which, under the comprehensive title of "Dust Disease," Robert Hessler[1] thinks he has traced the cause of many minor ailments and ill-defined troubles.

Mouth-breathing deprives us of an important safeguard against both evils. W. C. Rivers[2] has analyzed 67 cases in residence at three sanatoria, and found that 19.4 per cent. were mouth-breathers, and he quotes Moeller and Rappoport[3] in support of the very high percentage of the occurrence of some disease of the upper air passages as a preliminary to pulmonary phthisis.

VENTILATION. *Dustless Air* is a great desideratum in our habitations; its supply is not beyond the capabilities of modern engineering, and has, indeed, been achieved[4] in isolated instances by "screening" the air admitted into a building. The drawback is the air-tight closure of all other apertures which that method of ventilation necessitates, and the abandonment of the "open-window system" which we have labored to inculcate.

Contamination of the Air of Rooms by Orators with the *streptococcus brevis* of saliva and other micro-organisms has been proved by Mervyn Gordon,[5] of the Local Government Board, to take place to the extent of 10,000,000 per cubic centimetre.

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[1] American Medicine, October 1, 1904.

[2] British Medical Journal, April 29, 1905.

[3] Zeit. f. Tuberk. u. Heilk., July, 1903.

[4] Editorial, Journal of the American Medical Association, October 29, 1904.

[5] Journal of the American Medical Association, October 22, 1904, p. 1242.

Elevated Railways in the congested districts of the poor are a distinct violation of the elements of town hygiene. A. S. Knopf[1] has written a timely article of protest against this evil.

TUBERCLE FROM THE TUBERCULOUS VIA THE AIR is the old conclusion impressed again upon Beitze[2] by all recent research; another source being, of course, bovine tuberculosis. In the latter instance contaminated air and milk are the dangers.

CONVALESCENCE FROM SEVERE ACUTE INFECTIONS is undoubtedly a period of bacillary danger, though not as implied by E. de Batz,[3] the only one. Were it so, a safe remedy could always be found in the resort to a climate such as that of Arcachon, equable in temperature and in moisture, marine, and yet free from the drawbacks of the open coast, where convalescents could undergo the "triple cure" by superäeration, superalimentation, and complete or modified rest.

IS VALVULAR HEART DISEASE A PROTECTION AGAINST TUBERCULOSIS? Norris[4] concludes that it exerts little if any influence, either causative or inhibitory, except in the case of pulmonary stenosis which does not seem to increase the liability of infection. The investigation, conducted on a basis of 7040 necropsies and of 1276 clinical histories, throws light also upon other questions of etiology second only in importance to the above.

An Amended Classification is proposed by Karl von Ruck,[5] in a valuable paper, which urges that the prognosis of cases should be a prominent element in classification, and also that the old distinction between "phthisis" and "tuberculosis" should be upheld. With these views most clinicians will agree.

The Diagnosis and Prognosis. EARLY DIAGNOSIS. The best method of early diagnosis is, according to Prof. Grancher,[6] skilled auscultation of the inspiration, which should discover no difference between the right and the left side. Impaired percussion resonance is the sign of a pasty engorgement or "*empatement,*" which can only result months, or may be years, after the infection. And again, the discovery of bacilli is too late a sign. Tuberculin is dangerous; radiography is very uncertain; serum diagnosis is also indefinite and untrustworthy; cytodiagnosis is liable to the same objection, and equally so is respiratory chemical analysis. Although Grancher's belief in respiratory changes as the earliest revelation is fully in accord with my own clinical experience, we cannot wisely cast aside the useful confirmation obtainable from the character of the expiratory murmur. It has its diagnostic value quite apart from the old belief in a "blowing expiration" as the earliest sign. One practical conclusion remains to be drawn from Grancher's utterance, and it is this: if our hunt for tuberculosis is to be efficient, we must be excellently mounted. Part of the crusade must be training of first-rate auscultators.

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[1] New York and Philadelphia Medical Journal, March 18, 1905.

[2] Berl. klin. Woch., January 16, 1905.

[3] Rev. Internat. de la Tuberc., 1905, p. 195.

[4] American Journal of the Medical Sciences, October, 1904.

[5] New York and Philadelphia Medical Journal, March 11, 1905.

[6] Rev. Internat. de la Tuberc., 1905, p. 142.

An excellent method is suggested by C. Giriho[1] for the education of the ear and for increasing its power of discrimination. He recommends that the student should undertake a systematic examination of the inspiratory murmur in a series of healthy subjects, listening in succession over symmetrical points in both sides of the chest, so that he may learn to appreciate the slightest difference in the quality of the respiratory murmur.

Early diagnosis is also discussed in useful papers by Cheney[2] and by Charles A. E. Codman,[3] who trust to the old methods of examination, rather than the new.

The earliest physical signs of pulmonary tuberculosis are also in the estimation of Lawrason Brown[4] the auscultatory. They are to be found, in the slight alterations perceptible in the character of the vesicular murmur. Auscultation is, therefore, by far the most searching method of physical examination in incipient tuberculosis.

The Early Signs of Pulmonary Tuberculosis Include Myxœdema, observed by William Stokes in 1830 and described in 1851 by Maurice Schiff under the name of "idiomuscular action." Henry L. Shively[5] contributes a clinical paper to its study. *Pityriasis Versicolor,* as pointed out by L. E. Bertrand,[6] is also often present on the thorax quite early in the affection, at a time when it might assist the diagnosis.

Much importance attaches to the differential diagnosis between incipient pulmonary tuberculosis, healed cavities, and non-tuberculous fibrosis, a study contributed by George W. Norris[7] to the Henry Phipps Institute.

The Diagnosis of Enlarged Bronchial Lymph Nodes is shown by Alfred Friedlander's[8] excellent paper to have received very insufficient help from auscultation and percussion; but we should not forget that radioscopy may afford valuable aid. Meanwhile, Friedlander lays stress upon the *lymphocytosis,* which he regards as characteristic, and he sug-

[1] Gaz. degli Osp., 1904, No. 85.

[2] American Medicine, October 22, 1904.

[3] Medicine, Detroit, May, 1904.

[4] Medical News, October 15, 1904.

[5] New York and Philadelphia Medical Journal, January 14, 1905.

[6] Sem. méd., April 12, 1905.

[7] New York and Philadelphia Medical Journal, July 16, 1904.

[8] Journal of the American Medical Association, January 7, 1905.

gests that irritation of the tracheobronchial glands in measles and in pertussis may set up the lymphocytosis which is usually attributed to the infection in these diseases.

Inequality of the Two Radial Pulses has been noted by J. Sorgo[1] in 8 per cent. of a series of 397 cases of pulmonary tuberculosis. This inequality, which varies with the position of the limb and disappears in certain attitudes, is to be explained by the influence exercised upon the subclavian artery by the retraction of pleuro-pulmonary indurative lesions of the apex. This may occasionally prove to be, as suggested by Sorgo, a useful confirmatory sign.

Hyperglobuly in Tuberculosis. S. Mircoli[2] seeks to explain the marked hyperglobuly which he has traced in cases of limited local torpid tubercle, to the stimulating effect of the small doses of tuberculin absorbed from these lesions. The details of the research are given by S. Rebaudi and L. Alfonso.[3]

The Vagus Reflex described by T. J. Mays,[4] varying in intensity from mere tenderness to dyspnœa and vertigo, was elicited on the same side as the lesion in 97 per cent. of the patients examined and in only 3 per cent. on the opposite side. Mays regards the reflex as valuable for prognosis, as well as for diagnosis.

Phthisis May Be Closely Simulated by Pulmonary Syphilis. An instance in point is related by William E. Hughes and Robert N. Willson,[5] where repeated hæmoptysis and some of the other signs of phthisis were present, but no bacilli had been found. Rapid improvement set in as soon as iodide of potassium was administered, and the patient made a good recovery.

The Spontaneous Curability of Pulmonary Tuberculosis is much less in childhood and youth than afterward. Blumer and Lartigau[6] find that the *spontaneous healing age* occurs ten years earlier for females, and the maximum of active cases of disease also ten years earlier than in males.

The Laboratory Methods of Diagnosis and Treatment. OPSONINE. WRIGHT'S TEST FOR ITS ESTIMATION. Considerable impulse has been given to serotherapy and to the use of tuberculin by Wright's discovery of a method of estimating, and, within certain limits, of modifying the resistance of the blood to bacillary invasions, and of raising the efficiency of its phagocytes. Opsonine is the name given to a protective body in the serum, the action of which is to cause the bacilli to fall an easy prey to phagocytes. The opsonic coefficient of any given serum is represented by the number of bacilli ingested by leukocytes in the space of fifteen minutes, when the serum to be tested is brought into contact with leukocytes and with bacilli.

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[1] Wien. klin. Woch., December 15, 1904.

[2] Editorial, Journal of the American Medical Association, September 10, 1904.

[3] Gaz. degli Osp., 1904, xxv., No. 70.

[4] New York Medical Journal, September 3, 1904.

[5] Medical News, February 25, 1905.

[6] California State Journal of Medicine, September, 1904.

While the administration of tuberculin tends ultimately to raise the opsonic power of the blood, it is apt to be followed at first by a negative phase of diminished resistance. This can be recognized, thanks to the test, and avoided as unfavorable. This method thus renders available the advantages of tuberculin without the risks, and very encouraging results have been reported by Wright from tuberculin treatment regulated by this means.

VACCINATION AGAINST TUBERCULOSIS. Wright and Douglas[1] contend that the blood's opsonic index and its agglutinating index are available as tests of the degree of resistance to tubercle possessed by the individual. Whether or not protective substances are present in the blood at birth—and it is well known that von Behring[2] regards the newborn as specially susceptible to all infections because of the immature state of their intestinal epithelium—they consider that tuberculotropic substances (*i. e.*, substances entering into combination with the bacillus) are capable of elaboration in man in response to the inoculation of a tubercle vaccine.

PROTECTIVE DIRECT INOCULATION, VACCINATION, OR "JENNERIZATION (von Behring)—*i. e.*, the direct injection of bacilli of attenuated virulence, such as the human bacillus passed through the slow worm (Moeller), or such as the tortoise bacillus (Friedmann), has been largely tried in animals. Moeller finds that the serum of animals Jennerized from the slow worm strongly agglutinates human bacilli. He claims that the slow worm bacillus is non-pathogenic to warm-blooded animals, and that its tuberculin also has immunizing power. Moeller[3] has Jennerized himself, and subsequently exposed himself to the danger of tuberculosis by the direct intravenous injection of a small dose of a culture of human bacilli, fortunately, without paying the penalty for his rashness.

LEUKOCYTOSIS is not a feature of pure miliary tuberculosis,[4] but of the mixed infection with pyogenic cocci. The aim of much of our modern treatment by overfeeding is to set up instead of leucopenia a salutary leukocytosis, such as follows the use of yeast, or of nuclein, or the intravenous injection of sodium cinnamate (Landerer), or its injection under the skin (Lovell Drage), or more simply an abundant proteid dietary. According to Bardgwell vegetable proteids are as efficacious in this respect as butchers' meat, although inconveniently bulky.

TUBERCULIN. The new as well as the old tuberculin of Koch and various serums are now being more widely used. The present time is, therefore, opportune for a brief comparative review of these agents, such as that supplied by C. H. Cattle.[1]

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[1] Lancet, October 22, 1904.

[2] W. Gessner. Zentralblatt f. inn. Med., August 6, 1904.

[3] Zeit. f. Tub. u. Heilst., 1904, Bd. v., Heft 3.

[4] Practitioner, April, 1905.

Koch's Old Tuberculin, containing some of the toxins formed by the bacillus and some glycerin, was obtained in 1890 from old cultures filtered free from germs. One milligram injected under the skin produces a sharp pyrexial rise and an inflammation around the tuberculous focus, be it lupus at the cutaneous surface, or an intrapulmonary lesion. This is the "reaction" which has continued to be utilized as a diagnostic sign even when the therapeutic use of the tuberculin was given up.

Koch's "Tuberculin R.," brought out in 1897, contains 10 mm. of ground-up dead bacilli in each cubic centimetre of the suspending fluid. The initial dose is $\frac{1}{500}$ of a milligram of the solid substance, or less if a reaction should occur.

Koch's "New Tuberculin" followed in 1901. It likewise consists of powdered bacilli (the dose of which is $\frac{1}{400}$ of a milligram) suspended in 50 per cent. of glycerin, and is heated for an hour to 60° C., to ensure its not containing any living bacilli.

No tissue necrosis such as that originally obtained accompanies the pyrexial reaction due to these later tuberculins. Their purpose is rather that of a vaccine intended to gradually stimulate the tissue-cells to a higher resistance, and to a secretion of protective substances, as shown by an increasing agglutinative power of the blood. Cattle believes that the new tuberculin has a useful future in this direction.

Is Pyrexia a Contraindication to the Use of Tuberculin? C. H. Cattle[2] also briefly considers this practical question. He points out that while the injections are generally reserved for the absolutely or nearly apyrexial stages, Koch uses a modified tuberculin, even in febrile cases. Wright has also reported good results in a case where the injections were made when the temperature was 100° F. Cattle believes that in cases of persistently high fever, Maragliano's or Marmorek's serum might be tried.

The Choice of Cases Suitable for Treatment by Tuberculins is ably discussed in a lecture by H. Batty Shaw.[3] He calls attention to the infections known as perlsucht or bovine tuberculosis, as avidin, and as fish tuberculosis, all characterized by acid-fast and alcohol-fast bacilli, and also the allied affections capable of arising from inoculation with outlying representatives of the group, such as butter bacillus of Petri and Rabinowitsch, the timothy bacillus growing on *phleum pratense* (Moeller), the grass bacillus, the mist bacillus, the Belzig milk bacillus (Moeller), the tortoise bacillus (Friedmann), etc. Shaw furnishes us with an instructive critical review of the chief bacteriological remedial agents at present or recently in use, with an account of their reported results. *The statistical* proof of the value of treatment by Koch's tuberculins is supplied by Moeller's tabulated figures.[1]

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[1] Practitioner, April, 1905.

[2] Ibid.

[3] Clinical Journal, May 3, 1905.

I. MOELLER'S COMPARATIVE RESULTS OF SIMPLE SANATORIUM TREATMENT, AND OF THE SAME COMBINED WITH BACILLARY EMULSION (T. E.) TREATMENT, AT BELZIG.

Form of treatment. Total number.	Cured.	Markedly improved.	Improved.	Unchanged.	Worse.	Dead.
General methods (772)	85 11 p. c.	215 28 p. c.	274 36 p .c.	162 21 p. c.	29 3.2 p. c.	7 8 p. c.
General methods combined with tuberculin (T. E.) (193)	58 30.1 p. c.	92 47.6 p. c.	33 17 p. c.	10 5.3 p. c.		

II. MOELLER'S COMPARATIVE RESULTS, WITH REFERENCE TO THE THREE STAGES OF TURBAN.

Stage and mode of treatment.	Cases.	Healed, per cent.
Stage 1. General methods	236	33.1
General methods combined with tuberculin (T. E.)	89	52.8
Stage 2. General methods	240	2.9
General methods combined with tuberculin (T. E.)	63	17.6
Stage 3. General methods	296	
General methods combined with tuberculin (T. E)	41	

The most suitable cases for tuberculin are, of course, those of Stage 1; and even in spite of some fever, the less extensive lesions in Stages 2 and 3 may, according to Koch, also be treated. The "closed" tuberculosis cases (no bacilli in sputum) are the more favorable ones (Petruschky).[2] Petruschky's "interval treatment" provides for periods of some months' continuous treatment, and for a renewed examination, and, if necessary, renewed treatment by tuberculin after three months' interval. He has obtained cures in 100 per cent. of his cases.

The Indications to persevere with the treatment are: 1. Permanent fall of temperature. 2. Progressive gain in weight. 3. Progressive general improvement and appetite. 4. Progressive diminution of catarrhal signs.

The Chief Contraindications to the use of tuberculin are tabulated by Shaw as follows: 1. Steady loss of weight and strength. 2. Irregular pyrexia, continued for some days. 3. Secondary infections. 4. Hæmoptysis. 5. Heart disease. 6. Any suspicion that the serous coverings of the brain or spinal cord are involved. 7. The presence of the diazo reaction. 8. Albuminuria. 9. Tubercle of the alimentary tract. 10. Advanced emphysema. 11. Extensive pleural effusions. 12. Laryngeal tuberculosis. 13. High-pulse frequency. 14. A highly nervous temperament.

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[1] Zeit. f. Tub. u. Heils., 1904, Bd. v., Heft. 5.

[2] Berliner klin. Wochen., 1904, No. 188.

The Various Tuberculin Preparations may be conveniently tabulated as follows:[1]

T. (1890).	"The original tuberculin" of Koch.	From media in which human bacillus has grown. Heated to 110° C., and filtered. No risk of inoculation. Produces local reaction. A diagnostic agent.
T. O. (1897).	Not used. (Tuberculin "oberer.")	
T. R. (1897).	"Tuberculin R." (Tuberculin "Rückstand.")	Filtered watery extract from powdered crushed bacilli + 20 per cent. glycerin, not sterilized by heat. Produces no local reaction. A remedial agent said to be immunizing.
T. A. (1897).	Not used. (Tuberculin alkalinum.)	
T. E. (1901).	"Bacillary emulsion."	Clear fluid decanted from powdered bacilli in a 50 per cent. glycerin solution. A blood agglutinant in reference to tubercle bacilli. Hence thought to be an immunizer. Fever no objection to its use.

Other tuberculins or tuberculin-derivatives are enumerated by Batty Shaw:[2] Denys' tuberculin; Béranck's tuberculin; Hirschfelder's "oxytuberculin;" Hunter and Kühne's albumoses, from the "original" tuberculin; Ruppel's tuberculinic acid; Klebs' tuberculocidin and antiphthisin; Hahn's tuberculo-plasmin (obtained from masses of bacilli by hydraulic pressure).

The Bovine Tuberculin known as P. T. O. is used by Carl Spengler,[3] on the strength of its protective effect on guinea-pigs inoculated with the bacilli of human tubercle.

The Tuberculin Test by Inhalation. E. Kapralik and H. v. Schrötter[4] have ascertained in a series of 28 cases that the test succeeds just as well by inhalation as by injection; only a thirty times larger dose is required—viz., 30 mg. in active cases and 250 mg. in latent pulmonary tuberculosis. They have also traced a decided therapeutic effect in connection with the test. They believe that the two methods might be combined with advantage.

Various changes are described by M. Sciallero,[5] of Maragliano's laboratory, as occurring in the tubercle bacilli found in animals immunized with tuberculin, which he has failed to observe so abundantly in non-immunized animals. He suggests that the discovery in the sputum of these degenerate and distorted bacilli may have a favorable significance.

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[1] Clinical Journal, May 3, 1905.

[2] Loc. cit.

[3] Deutsche med. Woch., 1904, No. 31.

[4] Wien. klin. Woch., 1904, Bd. xvii., No. 22.

[5] Gaz. degli Osp., October 23, 1904.

Tuberculosis conveyed to a monkey by inhalation is reported, by Marzagalli and Figari,[1] to have been completely cured with Maragliano's serum, as was demonstrated at the necropsy.

MARAGLIANO'S ANTITUBERCULAR SERUM, derived from horses immunized with sterilized cultures, claims to be destructive of the life of the bacilli, as well as of their toxin. The dose is 1 c.cm. The results of the 2900 cases published are encouraging, but are not much better than the results of the ordinary sanatorium methods, of which these cases had had the benefit. Cattle does not think that other observers have succeeded in obtaining results equally favorable from the use of Maragliano's serum.

MARMOREK'S ANTITOXIC SERUM is also obtained from horses immunized with a carefully filtered culture, a culture rendered specially toxic by growing a strain of "young bacilli" in a medium of leukotoxic calf serum and glycerin liver bouillon. The toxin in question is supposed by Marmorek to be that which, he believes, is secreted under the stimulus of Koch's tuberculin injection and is responsible for the reactions. Of the antitoxic serum thus obtained, 5 c.cm. are injected on four consecutive days, followed by three days' rest, for a prolonged period. The verdict on this serum has been far from unanimous; but the later reports seem to be more favorable than those published at first, and the serum is now fairly under trial. Cattle draws attention to the unpleasant drawbacks to the use of horses' serum (rashes, pyrexia, etc.).

Marmorek's serum has been used in several cases of chronic phthisis by Frey, who reports 9 of them in detail in the *Munchener med. Wochenschrift*, 1904, No. 44. The aggregate number of his injections was about 350. The usual method was to inject 3 c.c. the first day, and increasingly more daily until 8 c.c. were given on the tenth day. After this first series came a pause of eight to ten days, and then a fresh series of daily injections, raising the dose up to 20 c.c.; and after a second pause a similar series was resorted to. The extensor aspect of the arm was the site preferred. Frey is able to say for the serum that it is well borne, although not free from the complications of local reaction with its slight pyrexial influences and of serum rash, nor from an initial rise in the slightly pyrexial cases, to be followed, however, by a distinct and lasting fall.

A favorable effect was traced in the pure tuberculous pyrexiæ. In the expectoration there was likewise a transient initial increase, but afterward a marked diminution. Allowance being made for the Davos climatic advantages, the treatment itself still seemed to Frey to deserve credit for genuine results. But he admits that further experience is needed to justify the larger claims advanced in its support.

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[1] Gaz. degli Osp., October 23, 1904.

G. P. Teleny,[1] in an experience with 3 cases, speaks unfavorably of its capability and of its risks.

BOVINE TUBERCULIN SERUM has been suggested by Nathan Raw as likely to be hostile to the bacillus growing in human lungs, because those patients who have recovered from forms of tuberculous disease which he deems to be of bovine origin are immune against the human bacillus.

Karl Spengler, of Davos Platz, has published identical views, and is carrying out extensive clinical observations, the results of which have appeared to him to be very satisfactory, although other observers in Davos have not been so well pleased with the method.

HÆMOANTITOXINE is a new form of antitoxin, for administration by the mouth, in doses of a tablespoonful before meals four times daily. Figari,[2] who has tried it in a few cases in Maragliano's clinic, is satisfied that it did good and increased the agglutinating power and the antitoxic power of the serum.

For Glandular Tuberculosis, Giuseppe Ricci[3] recommends 5 c.c. injections of serum obtained from animals previously immunized by injecting aqueous extracts of living bacilli. An interesting feature in this method is the local application of compresses saturated with the serum.

The Administration of Serum by the Mouth is a recent method noticed by Hollen.[4] Porteus, MacDonald and others have given diphtheria antitoxin by the mouth and by the rectum with satisfactory results. Hewlett, however, does not believe in its absorption by the bowel; and Oppenheimer doubts whether it can resist gastric digestion.

The tuberculin test has been administered in this way by Freymuth,[5] who finds that the effect is satisfactory, provided gastric juice is excluded.

THE SERUM DIAGNOSIS originated by Arloing and Courmont was fully described by them at the St. Louis Congress.[6] They claim that, although the agglutination may fail in some advanced cases, it occurs in the earliest stage in advance of all physical signs.

The Treatment of Tuberculosis. MEDICINAL THERAPEUTICS. Occasional therapeutic retrospects are wanted, such as that by J. Edward Stubbert.[7] He has arrived at the significant conclusion that to prescribe climate alone would be equally culpable as to ignore climate, diet, hygiene in favor of medicinal or other treatment. Our duty lies in a judicious, scientific combination of the two basic lines of treatment. If that principle be recognized, our office as physicians is not altogether resigned to the open-air sanatorium architect and to the cook. Nay, our responsibility is deeply involved in finding the healing agent which, by curing lungs more quickly, shall solve the social problem of tuberculosis. Who can gainsay that good effects have resulted from various remedies? Let us not resign all hope of less partial success to come. Open air cannot be improved, but there is no limit to the yet undiscovered in science.

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[1] Roussky Vratch, October 16, 1904.

[2] New York and Philadelphia Medical Journal, April 30, 1904.

[3] Gaz. degli Osp., October 23, 1904.

[4] Medicine, March, 1905.

[5] Journal of the American Medical Association, February 25, 1905.

[6] Boston Medical and Surgical Journal, 1904, vol. cli., No. 23.

[7] Medical News, April 16, 1904.

Meanwhile, disappointment is tempered to the lung sufferer by his utter faith in pure air, which renders less heavy to bear the broken promises of specifics. The latest sensation was loretin or griserin[1] as an alleged infallible internal antiseptic, and for a while hopes ran high at Davos. Schomburg's trial of it in 12 cases[2] yielded no beneficial results.

Anarcotine is loudly praised and recommended for clinical trial by J. H. Frazer.[3] We must await further reports.

Arsenic is still strongly recommended by Renon, of Paris,[4] who also uses creosote, guaiacol, or thiocol, urea, tannin or tannigen (4 grains at a dose), and glycerophosphates. *Diarrhœa* is best treated with cotoin (2 grains in wafer) or methylene blue (2 grains, with lactose, in wafer).

Treatment by Calcium Salts is a recurring idea tried and tried again. Its recommendation by A. Michelazzi[5] is backed chiefly by the good effects of large administrations of calcium phosphate in the experimental tuberculosis of animals. Was the phosphoric acid the beneficent agent? Rudolph's advocacy is based upon a limited number of clinical results, which give some support to Michelazzi's contention.

Intravenous Injections of Hetol (Sodium Cinnamate) administered by T. Barrett Heggs[6] to 7 of his patients for periods of from six weeks to six months, in doses varying from 20 to 50 mgm., produced well-marked leukocytosis and decided benefit. He recommends the treatment as a useful adjunct.

The hetol injections of Landerer have also proved satisfactory in the hands of R. Blum,[7] but he cannot yet vouch for the permanence of his cures.

On the other hand, O. Prym,[8] who treated 22 cases, including severe ones, reports rather unfavorably as to the effect upon the latter. As a fact, Landerer originally intended his method for early and apyrexial cases only. F. Schrage,[9] who has followed that rule for upward of four years, has had good results, but does not profess to have cured all the cases treated by him.

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[1] K. Kuester, Berliner klin. Woch., October 24, 1904.

[2] Ibid., January 2, 1905.

[3] Lancet, November 26, 1904.

[4] Medical Press, February 15, 1905.

[5] Gaz. degli Osp., 1904, xxv., No. 40.

[6] Lancet, 1904, No. 4234.

[7] Therap. Monats., June, 1904.

[8] Münch. med. Woch., 1904, No. 44.

[9] Ibid.

A Simplified Method of Intratracheal Injection is used by Mendel[1] with very satisfactory results. After trying various solutions, he finds most benefit from sterilized oil (1 to 3 drachms), containing from 6 to 9 c.c. of *eucalyptol.* The technique consists in drawing out the tongue, directing the tip of the curved syringe horizontally toward the opposite wall of the pharynx, and forcibly driving the injection against the latter, so as to cause it to rapidly drop down into the larynx.

Iodine and Carbon Disulphide Inhalations. A strong advocacy of iodine remedy, originally recommended by Stovall and Twitty,[2] and also approved by Coromilas, of Athens,[3] is put forward by C. I. C. Atkeson[4] in a letter to which is appended an editorial note describing the method. Coromilas used the *carbon disulphide* hypodermically, and ascribed its value to the penetrating power of the drug as to its action upon the bacillus. The addition of iodine precludes its hypodermic use. Further clinical reports are needed.

The Iodoform Injection originally described by Thomas W. Dewar[5] in 1903 is now practised by him with a modified solution, 40 per cent. liquid paraffin being added to the ether to render it blander and more easily introduced into the smallest veins. Half a grain of iodoform will partly dissolve in 10 minims of paraffin, and this preparation has sometimes been used alone, but is more suitable for joints. His later experience has confirmed his early opinion of the great value of the treatment. The results reported are undoubtedly good.

Cyllin in the Treatment of Pulmonary Tuberculosis. W. C. Lodwidge[6] has treated 8 cases, including advanced cases, by inhalations of cyllin, with encouraging results, such as steady increase in weight, diminution in the sputum, and relief from cough and night-sweats. Tested against vigorous cultures of the bacillus typhosus, cyllin is twelve times as powerful as carbolic acid, and, although harmless, is superior in its relative bactericidal value to the various disinfectants used as inhalants. Further, cyllin may be inhaled without any deleterious results.

Cyllin was isolated by Ainslie Walker after prolonged research on the suggestion quoted from Pellicani by Sir Lauder Brunton,[7] that substances containing a diphenyl nucleus are less poisonous and at the same time more powerfully antiseptic than those containing a single phenyl nucleus.

Hygiene. A special group might be constructed to include the more tonic measures of hygienic treatment, such as climate, altitude, respiratory, and general exercises (Fernand Lagrange, Rosenthal, J. Madison Taylor,[1] Fleming).[2]

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[1] Bull. de l'Acad. de Méd., 1904, Bd. lxviii. No. 25

[2] New York Medical Journal, April 25, 1896.

[3] Journal of the American Medical Association, November 26, 1904.

[4] Ibid., February 4, 1905.

[5] British Medical Journal, November 21, 1903; ibid., January 14, 1905.

[6] Lancet, February 11, 1905, p. 377.

[7] Croonian Lectures, 1889.

Other agents, such as mechanical vibration, electricity, *x*-rays, and other physical methods are advocated as aids to the cure in two papers by Arnold Snow and by J. D. Gibson.[3] We are still, however, very uncertain as to the degree of hygienic value attaching to these modern developments.

Work Itself, a systematic "work cure," analogous on different lines to the "rest cure," has been ably advocated by Herbert J. Hall,[4] in an original article on "The Systematic Use of Work as a Remedy in Neurasthenia and Allied Conditions." Although in pulmonary tuberculosis physical rest has to be enforced in the majority of cases for considerable periods, there comes a time when the convalescent needs to be re-educated to activity, and should not be denied the tonic treatment by systematic occupation, This is a truly hygienic method, but one requiring above all others judgment and adjustment.

HÆMOPTYSIS. *A Case of Fatal Hysterical Hæmoptysis* recorded by M. N. Pende[5] is said to be unique in literature. The patient was a robust girl, aged seventeen years, always healthy, but recently depressed by her sister's death from phthisis. The hysterical stigmata were undoubted; but there was absence of pulmonary signs and of bacilli and elastic fibres and mucus in the sputum. In the hospital the recurring hæmoptysis was controlled by suggestion, as hysteria was diagnosed; but it returned in a fatal form at home. A careful examination of the lung revealed no lesion (Marchiafava). Pende regards the hemorrhage as due to diapedesis, and he calls attention to the perfect imitation of the disease presented by hysteria in this case. The temperature had reacted to tuberculin; but the guinea-pigs inoculated with the sputum did not suffer.

The Treatment of Hæmoptysis is viewed among us from very different standpoints. *A priori* reasoning and beliefs do not alter the hard facts of practice. C. H. Cattle[6] distrusts ergot and adrenalin, because of their vasoconstricting effect; but let us not forget that vasoconstriction is worth securing at the bleeding spot. Likewise, it is open to question whether there is more of risk or of advantage in the vasodilatation obtained by means of drugs such as nitroglycerin.

The Arterial Pressure Dilemma in the Treatment of Hæmoptysis shows no signs of being cleared up. Ergot, once banished because of its powerful pressor effect, is recommended again by H. Hyslop-Thomson[1] (in the form of *ergotin* injection) in the hæmoptysis preceding or accompanying menstruation. The exactly opposite agent, *amyl-nitrite*, is praised by Francis Hare.[2] He reports very good results from the amyl nitrite inhalation.

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[1] New York and Philadelphia Medical Journal, October 8, 1904.

[2] Edinburgh Medical Chirurgical Society, February 1, 1905; Medical Press, February 15, 1905.

[3] Journal of American Therapeutics, New York, July, 1904.

[4] Boston Medical and Surgical Journal, January 12, 1905.

[5] Il Morgagni, July 9, 1904; British Medical Journal, September 10, 1904.

[6] British Medical Journal, January 14, 1905.

W. B. McLaughlin[3] has also treated cases successfully by injection with nitroglycerin ($\frac{1}{100}$ grain), and with morphine ($\frac{1}{4}$ grain), and strapping the chest on the bleeding side.

Calcium Chloride Rectal Injections are used by H. Hyslop-Thomson[4] in the following manner: "Immediately on the onset of hemorrhage the head and shoulders should be raised and a hypodermic injection of morphine given ($\frac{1}{6}$ to $\frac{1}{3}$ grain). Then 30 to 40 grains of calcium chloride dissolved in a small quantity of water should be injected high into the rectum, and an ice-bag applied to that part of the chest immediately underlying which is the most active tuberculous focus. At the same time the determination of blood to the lower limbs should be encouraged by the application of heat."

The rectal injection can be made through a soft catheter, after bending the knee and hip, without any disturbance to the patient. Calomel is always useful—mineral acids, alum, and iron only in mild cases. But the application of heat to the abdomen is prescribed by Hyslop as a routine measure. On the whole, the combination of remedies which he employs fulfils the urgent indications with a minimum of discomfort to the patient, and is worthy of trial.

He has also tried *adrenalin*, but is not in favor of its administration.

The subject of blood coagulation in its therapeutic aspects is also dealt with by Leo Loef[5] and by Gley and Richaud.[6]

Among other remedies found of use by individual observers, the subcutaneous injection of *atropine* (0.0002 to 0.0006 gm.) repeated on six consecutive days was successful in the hands of W. O. Woltke[7] after all other remedies had failed.

The measures specially recommended by H. Hochhaus,[8] in addition to ice locally and internally and to a compressing bandage, are the subcutaneous injection of *gelatin*, which he finds of much value, and *compression of the veins* of the limbs.

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[1] British Medical Journal, December 17, 1904.

[2] Lancet, November 19, August 20, and October 1, 1904; also Journal of the American Medical Association, March 4, 1905, p. 728.

[3] Medical Record, September 17, 1904.

[4] British Medical Journal, December 17, 1904.

[5] Medical News, April 1, 1905.

[6] Presse méd., 1904, No. 32.

[7] Med. Oboz., Bd. lxi., No. 2; Journal of the American Medical Association, February 4, 1905.

[8] Deutsche med. Woch., January 31, 1905, Bd. xxxi.

A Hæmogelometer to Time the Coagulation of the Blood for clinical purposes has been invented by U. Biffi.[1] It consists of a platinum wire made into a chain of five small loops intended to be charged with blood from the bleeding puncture. A test-tube half-filled with water at 68° to 77°, and provided with a thermometer passing through a perforated cork (which also holds the wire) is the means of determining by successive submersions of each of the loops the time which must elapse (nominally between seven and ten minutes) before the blood is set into a clot which will not diffuse in the water.

FOR THE TREATMENT OF NIGHT SWEATS, H. Ulrici,[2] states that atropine, agaricine, camphoric acid, guaia-camphol, and camphorate of pyramidon stand in a decreasing scale of efficacy. Ulrici adds to the list *veronal*, to be administered at bedtime in a small dose of 5 grains every night until it succeeds. The sweating usually stops after three nights.

The Sanatorium and Home Treatment. THE SANATORIUM TREATMENT OF PHTHISIS. IS IT WORTH WHILE? W. B. Ransom's[3] question is answered by himself from impressions, even more than from statistics. The readiness of medical men when attacked with phthisis to resort to a sanatorium is sufficiently eloquent. He agrees with Walther that the prognosis of bad cases cannot be framed without some continued observation. This suggests the value of a stay of probation in an urban hospital, a course which I have often advocated for the sake of the opportunities for treatment, as a means of eliminating the hopeless cases which nothing can assist. Sanatoria and hospitals are indispensable, even though their benefits are not always permanent. But homes are also wanted for the isolation of advanced cases, as well as the useful "out-nursing" or "dispensary" system, which was, it appears, first elaborated by Philip in 1887, and also independently evolved by Calmette in Lille and by others. Ransom's question might be perhaps modified thus: "Is the sanatorium the best money's worth?"

It would serve no practical purpose to chronicle the opposing arguments in the paper war which has been waged over this question, nor to enter into the details of the many sanatorium statistics. We may accept it as proved even by the least successful results that there is every inducement to make us persevere and progress in the path which has been struck.

PERFECTION IN SANITARIUM TREATMENT HAS NO FINALITY. This is my own answer to any doubts expressed as to its value. "Open air" was given to primitive man. Though brilliant and successful, is its rediscovery much of an advance? More effective treatment is wanted than mere deck-chair life. With Henry Ashby[1] we must begin with *antenatal nurture and prevention,* and follow this up with infantile and juvenile hygiene, and with the teaching of hygiene at schools. As individual need arises for sanitarium treatment, the lessons of hygiene, of physiology, and of clinical medicine in all its branches should co-operate with the primordial requisites of food and air. Frederick L. Hill's[2] excellent paper indicates how much scope is afforded in physical hygiene alone for the endless ingenuity and personal labor of the physician. Simon Baruch[3] still advocates hydrotherapy among the physical remedies, and many others during the past year contribute to the same phase of therapeutics.

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[1] Cronica Med., Lima, xx., No. 372; reported in the Journal of the American Medical Association, November 19, 1904.

[2] Therap. Monats., December, 1904.

[3] British Medical Journal, January 14, 1905.

Special Hospitals Based on the Sanitarium Plan and situated in the country are, in Guido Salvini's[4] deliberate opinion, after two years' experience of the special ward system at the Ospedale Maggiore of Milan, the only form of hospital relief which can be recommended. They would not, however—any more than can sanitaria—solve the question of public prophylaxis by isolation; and we are driven back to a study of the preventive factors in individual hygiene.

"A SANATORIUM ON WHEELS" for consumptives is proposed by Walter H. Haw,[5] in the shape of a six months' journey through South Africa in a bullock wagon.

"Superannuated trolley cars" are an analogous style of residence. They were suggested by William H. Peters;[6] but when the offer of some old cars was made to the Hudson County Board of Freeholders,[7] the conclusion was arrived at that tents would be cheaper and more serviceable.

H. Boyd Masten's[8] architectural plans for "An Ideal Tent Life in Southern Colorado and New Mexico," also appear to be too primitive for practical application.

OPEN AIR IN THE BED-ROOM. The accompanying illustrations of the ingenious *window tent,* described among other practical methods in an excellent paper by S. A. Knopf and W. B. McLaughlin,[9] hardly need any comment, but it will repay the reader to consult the original.

The "Villa Tournesol," made of brick, stone, and iron, and built at Dr. Pellegrin's suggestion by Eugene Pettit[10] on a steel turn-table, can be worked round by two men, so as to follow the aspect of the sun. It is properly supplied with drains and water.

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[1] Lancet, October 1, 1904.

[2] Journal of the American Medical Association, February 18, 1904.

[3] Medical Record, August 13, 1904.

[4] Rev. Internat. de la Tuberculose, 1905, p. 196.

[5] Lancet, April 8, 1905.

[6] New York and Philadelphia Medical Journal, December 10, 1904.

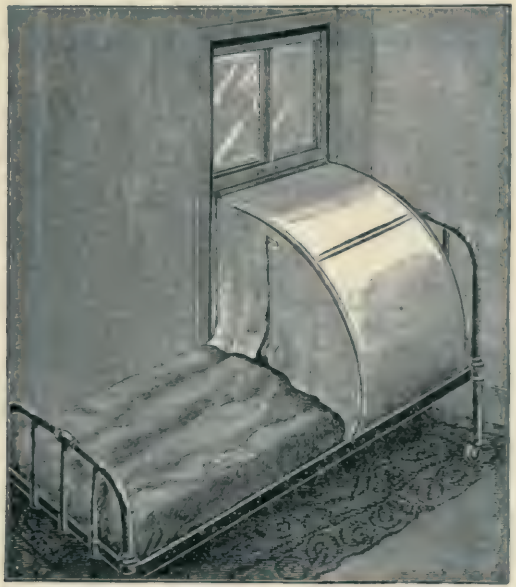
[7] Lancet, April 8, 1905, p. 966.

[8] New York and Philadelphia Medical Journal, November 19, 1904.

[9] Ibid., March 4, 1905.

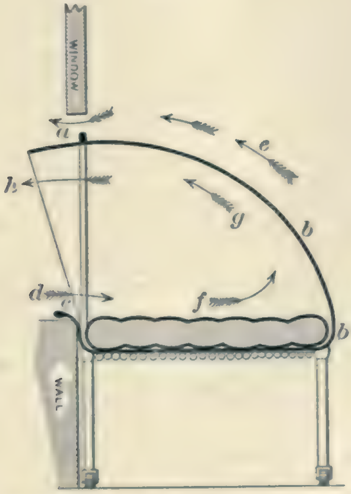
[10] Ibid., October 22, 1904.

FIG. 1



Window tent for the open-air treatment at home. The frame of the tent does not quite fill the lower half of the window; a space of about three inches is left for the escape of the air of the room.

FIG. 2



Cut of window tent, showing ventilation. The awning is made of stout duck and is waterproof. The patient enters the tent through a flap, which can be made either on the right or the left side of the tent.

THE TREATMENT AND THE CONTROL OF THE PATIENT IN HIS HOME is felt by Lawrence F. Flick[1] to be the only chance for the great majority. If consumption is to be wiped out, it must be by the education to be obtained at dispensaries organized to meet the great demand for individual relief of all cases, and for the protection of their environment. S. A. Knopf's[2] strong advocacy of dispensary methods is also well known.

Among the *errors in treatment* enumerated by Norman Bridge before the Chicago Medical Society (October 5, 1904), not the least is the abuse of climatic treatment. In more than half the instances it was advised for the wrong kind of cases, or at the wrong time, or for the wrong people; that is, with poor regard for all the circumstances in the situation.

On the other hand, R. W. Craig,[3] writing from Arizona, which, with the Southern California, Western Texas, and the Nevada regions, enjoys much sunshine and dryness, with good altitude, urges the claims of climate against those of home treatment for those who can afford it.

The abuse of the climatic treatment[4] is nowadays largely gratuitous, since sound and experienced advice is amply available, though too little sought. Excluding "impossible" cases, the climatic cure is good in the proportion in which it can be combined with real sanitarium treatment. Sea air is good; but life at sea cannot at present be made sanitarial.

SANATORIUM OR CLIMATE? The merits of this question could not be discussed by one more competent than a physician who, like Dr. Ronald Campbell Macfie,[5] has practised for years in a selection of health stations, inland and marine, tropical and glacial, and also sanatoria for the upper classes and for the lower classes in the three kingdoms. In respect of both lines of treatment, it may be said "experto crede." But to those without any experience of either he would recommend to take on trust sanatorium rather than the climate. In matters of climate, personal knowledge is indispensable; the untravelled cannot command the practical knowledge, though he may be guided by the data and figures of physical geography and by accepted principles. Among the latter, general recognition is awarded to the advantages of cold over heat, of dryness over moisture, of stillness over wind, and Burney Yeo stipulates for a daily variation of 20° F. The supreme value of the still and transradiant air of the altitude in suitable latitudes cannot be imagined until personally experienced, neither can it ever be forgotten thereafter. Yet, in discussing the "Utility and the Futility of Sanatoria," Macfie states positively that "all climates except relaxing ones are good," and that

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[1] American Medicine, July 30, 1904.

[2] Medical Record, July 23, 1904.

[3] New York and Philadelphia Medical Journal, December 3, 1904.

[4] Journal of the American Medical Association, November 19, 1904.

[5] Scottish Medical and Surgical Journal, January, 1905.

"the results obtained at sanatoria are better than those obtained by ordinary climatic treatment."

Sanatoria for the upper classes for various reasons, including after-cure, give more satisfactory results. Even in Germany, one in five of the "arrests" among the poor lasts for four years. As at present constituted in Great Britain, sanatoria for the poor are medically inefficient and economically wasteful. Three essentials are needed for turning out 80 to 90 per cent. of cures instead of 20 per cent., with the 1000 beds which are available. 1. Administrative machinery to collect and select cases. 2. Sufficient endowment to enable patients to be treated till cured. 3. Extramural workers to look after the homes and families of the patients during their absence.

The Influence of Aspect and Exposure and the Evil Influence of Rainy Winds. The facility with which a selection can be made in most countries between districts of different soil, conformation, and exposure for the best available treatment of consumption renders exceedingly important any definite information as to what should be avoided and what should be required in any site selected. Careful attention is, therefore, claimed for the elaborate investigation which W. Gordon,[1] of Exeter, has undertaken in support of his indictment against exposure to rainy winds. His endeavor has been to assess their damaging influence in comparison with any influence traceable to soil, altitude, temperature, dry winds, especially when dusty, rainfall, density of population, insanitation, poverty, occupation, race, preventive measures, other forms of tubercle, other respiratory diseases, and malaria.

His conclusions are that altitude has, *per se*, probably no influence at all; dry winds probably little effect; rainfall probably none by itself; density of population, insanitation, and poverty a definite influence, but less marked; prevalence of other forms of tubercle, of other respiratory diseases and of malaria apparently not any effect. The influence of exposure to rainy wind, therefore, appears to have a greater effect in increasing the phthisis death rate than any other influences, except those of extreme differences of race and of difference of occupation.

It would be otherwise inexplicable that in Devon the phthisis mortality in the most exposed rural district should have been more than twice as great as that in the least exposed; and than when females only were considered (as less likely than the men to be much out of their own parishes), the exposed parishes actually gave, in two different districts, five times and seven times the rate of mortality of the sheltered parishes.

Diet in Pulmonary Tuberculosis. In our modern treatment of pulmonary consumption, besides rest, there are only two essentials, open air and food. The crusade undertaken some years ago has been largely successful in overcoming rooted prejudice in the masses and heresy in our previously accepted teachings. Although much remains to be done, it can be said that unanimity now prevails as to the need for open air, as to its virtues and as to its mode of application.

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[1] Lancet, January 1 and January 14, 1905.

For various reasons, including the pathetic one of hard facts, an open crusade has not been instituted in connection with the remaining essential. Indeed, we have not had a sufficiently definite doctrine to teach, and uncertainty has resulted among the body of the profession from a lack of unanimity among the experts on some vital points. The time has arrived when more attention should be bestowed upon the matter of diet, with a view to the framing of principles and of simple rules which may with safety and benefit be widely published for general adoption. Before this can be done, careful consideration will be needed for a series of questions which still occupy the field of discussion and which are obviously difficult to settle. The function of respiration and the composition of air are comparatively simple. Alimentation is a much more intricate subject, and it is vastly complicated by the manifold aspects of the individual factor.

In my opinion there is no clinical question that could possibly be submitted for conclusions at the next Congress of Tuberculosis with more profit and greater urgency. The following questions are those which naturally suggest themselves: "What should be avoided as harmful in relation to food and drink?" "Which are the principles as regards the frequency, the quantity, and the composition of the supplies?" "Which are the available easily digested foods which should be most largely represented in the dietary of tuberculosis?"

THE FOOD AND THE STOMACH. Two distinct principles are usually confused under the comprehensive heading of "Overfeeding in Consumption." One of these is to feed and fatten the patient; the other is to train and strengthen the stomach. They correspond to different stages. During those of fever and feebleness gastric training cannot be thought of. The patient must be fed in spite of the stomach, and almost without its co-operation. Even in cases of complete prostration of the digestion, I shrink from resorting to exclusive alcoholic support, for alcohol contains less food than whey, or even than plain solution of lactose or of albumen. These are typically foods for absorption and not for digestion. During the pyrexial stage of any ordinary cases the dietary should be largely made up of these easily assimilated supplies. Milk and eggs, cream, meat-juice, predigested starch, and the sugars are all available, and can be administered and assimilated almost without any appetite and digestion. The stomach benefits at least as much as the rest of the body; it is rested and yet overfed.

Totally different is the other plan, which can only be gradually applied, that of working up the efficiency of the stomach by a progressive stress upon its function; that it may gradually engage more and more of the entire body energies in the work of alimentation. For those eating or digesting all day like the herbivora, relative bulk and coarseness of food is required. The object is to fill the stomach, and to make it earn its peptones by hard work. This is the plan usually understood under superalimentation. But the richer and readily absorbable foods need not be excluded; they can be thrown in over and above the solid supplies in judiciously measured proportions.

THE PERSONAL FACTOR IN PRACTICAL DIETETICS. On reviewing the literature of the dietetics of pulmonary consumption, I am impressed with the insufficient attention given the factor of individual metabolism. How great the extremes of personal variation in this respect must always be in connection with each of the elements of diet may be guessed from the contrast between enormous gains in weight and no gain whatever from forced feeding in any given series of healthy individuals. In disease, also, individual peculiarity must tell; and we may conclude that the most desirable proportion between the several constituents of food is a personal question to be answered apart from the generalized experimental observations.

THE INDIVIDUAL CAPACITY FOR UTILIZING SUGARS AND FATS is one of the most important points for determination in relation to our patient's diet. But a distinction will have to be made between three distinct notions; (1) The capacity for holding, (2) the capacity for storing, and (3) the capacity for utilizing the several foodstuffs. The fate of the sugar ingested is rather easier to trace by our urinary methods than that of the others, and it happens to be very important.

THE RELATIVE VALUE OF THE ELEMENTARY FOODSTUFFS has never ceased to be under investigation since the pioneer labors of von Liebig, von Pettenkofer, Voit, von Ranke, and Moleschott, and the ingenious researches of Lawes and Gilbert, which have been followed by the calorimetric investigation into their energy values by Rubner and others. More recently inquiry has been directed to their intimate vital effects upon the metabolism of tissues, on the one hand, and on the other to the correlated structural changes (as in diabetes, gout, rickets, scurvy, and many other affections) within the cells, including the wandering leukocyte, with its great potentialities. None of these studies are foreign to phthisiology, to which every collateral advance is a gain.

EXCESSIVE RAW MEAT DIET, analogous to the Salisbury raw meat and water diet, has been tried by Chalmers Watson[1] on various animals for the purpose of inducing gout. Healthy fowls after thirteen to sixteen months exhibited great enlargement of the thyroid and parathyroid glands, with changes similar to those of parenchymatous goitre in the human subject. Analogous results were obtained in rats. We are not concerned with his views as to the infective origin of gout, but merely with the possible bearing of these observations upon the dietetic question in phthisis. Meanwhile, Richet reports further experimental evidence in support of his zomotherapy in the *Revue de médecine* for January, 1905; and a strong plea is also entered by R. W. Philip[1] from the side of practical clinical experience.

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[1] Lancet, February 11, 1903.

"*Nutrigene*" powder, advocated by Laferre,[2] is beef predigested with artificial gastric juice and dried below the temperature of 40 per cent. He claims that it preserves the zomotherapical value of fresh meat.

In strange contrast with this nitrogenous superalimentation are the recent observations on physiological economy in nutrition by Chittenden and his coworkers, quoted by W. D. Halliburton.[3] They fed themselves for prolonged periods on diets with only half Voit's standard amount of proteid, and yet maintained their nitrogenous equilibrium. In connection with proteid absorption, Halliburton mentions that a much more complete proteolysis occurs in the alimentary canal than was formerly supposed. The tissue proteids would, therefore, seem to be capable of construction from the simple cleavage products; so that the living organism could construct from the fragments the tissues peculiar to itself, and maintain its chemical integrity, although the food taken might vary widely in composition. The part played by the tissue enzymes during life has received among other proofs that of the recent discovery of the urea-forming ferment, argenase.

IN CONNECTION WITH THE DIETETIC VALUE OF FATS as saving nitrogenous tissue waste, Laufer's[4] simple experiments, which may readily be checked by any clinician, would show that sugar is a much more efficient help. A uniform basis of diet being adopted in the shape of 3 litres of milk per day, the effect of adding to this 50 grams, either of cod-liver oil or of sugar, could be judged. The nitrogenous output was only slightly diminished by the oil, the body weight also falling slightly; but the output was distinctly reduced, while the gain was marked under the influence of a sugar diet.

At Verona, R. Massalongo and G. Danio[5] have had excellent results from sugar, as much as 100 to 500 grams being added to the daily diet.

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[1] Practitioner, February, 1905.

[2] Rev. Internat. de la Tuberc., 1905, p. 191.

[3] British Medical Journal, March 11, 1905.

[4] Bull. gén. de thérap., etc., November 15, 1904.

[5] Rif. Med., 1904, Bd. xx., No. 51.

The gain was sometimes greater than the amount of sugar ingested. Coffee, milk, or some bitter may be used to disguise the taste. It is a good substitute for cod-liver oil and suitable in febrile or slight pyrexial cases.

THE SALINE CONSTITUENT IN FOOD. Too little attention is usually paid to this fourth group in our foodstuffs, which is most essential in phthisis, with its ruinous catabolism of tissue. The phosphates are as it were the backbone of our cells, and the prominent part taken by them in the liberation of energy is shown by the large phosphatic output after brain work, as well as after muscular exertion. The characteristic depression peculiar to phosphatorrhœa suggests that in the wasting and depression of consumption there would be a special value in a high storage of phosphates as a reserve if it could be secured. This indication is already partly met by the method of superalimentation. It might, however, be still better served by a more direct supply. There is, therefore, good reason for the administration of the hypophosphites long ago recommended by Churchill. My own practice is to prescribe them liberally, regarding them as food rather than as medicine. The hypophosphites and the glycerophosphates have both been extolled. I now give them in combination as a powder or in a syrup, as their salts of sodium, calcium, and iron can now be procured in a soluble form. Three grains of each of the six salts can easily be dissolved in water flavored with syrup of orange, with or without the addition of strychnine, and the dose taken either in the interval between or shortly before or after the meals. This, I believe, fulfils a most important requirement in the scheme of tissue reconstruction.

IS ALCOHOL A FOOD? This theoretical question perpetually crops up in a practical clinical form, and from time to time it is submitted to renewed investigation. Quite recently W. E. Dixon,[1] of Cambridge, has arrived at the following conclusions: "Alcohol in small concentrated doses increases the rate of the pulse, the systole of the heart, constricts the deeper vessels, and increases the blood pressure, especially when the heart's action is feeble; it is therefore of great service in fainting. If much diluted it has little effect on the heart, but acts as a food, replacing starch in maintaining the heat of the body. In too large doses it depresses the heart."

The fact that the organism can extract some food value even out of alcohol is but too apt to be misconstrued into a statement that the latter is a useful nutritive agent. And this belief is the more likely to spread among the public if supported by professional utterances, such as have recently been published in the United States. There is clearly a wide difference between the view that alcohol is beneficial in consumption, as well as in some other diseases, and statements such as those by A.C. Latham,[1] that when food cannot be taken by consumptives alcohol is a sheet-anchor, and that "nothing but good results from the administration of large quantities of alcohol, when fever is present, so long as the pulse is becoming slower, the appetite better, the skin and tongue more moist, and the patient quieter." This can only refer to emergencies, not to routine of treatment. I hold with Knopf, who declares that in any stage or form of pulmonary tuberculosis large quantities of alcohol are contraindicated. In direct opposition to those who look to alcohol for an additional element of nutrition, we should dread any such contribution as a Danaan gift. The danger lest it should play its part in earnest as a "substitute," and exclude the due assimilation of genuine foods is too great to permit that we should prescribe it for the sake of a temporary stimulation. The better rule is to keep our patients independent of alcoholic beverages, even at meals; although Detweiler at Falkenstein practised to the letter, in regard to alcohol, also the precept to feed consumptives on the most gout-producing plan. The precept is a good one with that single reservation; but there are stimulants less risky than alcohol, and there are much richer available sources of carbohydrate—*e. g.*, sugar, in addition to the fats and to the easily assimilated nitrogenous preparations. The call for alcohol, even as an emergency food, is, therefore, reduced to very small limits.

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[1] British Medical Journal, March 11, 1905, p. 538.

The bacteriological elucidation of the alleged protective use of alcohol against infection has been attempted by C. Fraenkel,[2] who has studied the influence of alcohol upon the susceptibility of rabbits used to cultivate bacteria in connection with the infection of cholera and of typhoid. Their capacity to furnish a serum with specific characteristics was not diminished, but slightly increased by long-continued administrations of alcohol. But the author reserves his opinion as to any corresponding results upon man, and much less could he derive therefrom any conclusions as to the tuberculosis infection.

WEIR MITCHELL'S FEEDING METHOD, which sacrifices exercise for the development of fat and muscle, has furnished Abrams[3] with the best results; he continues it until the increase in weight warrants active exertion instead of passive movement and faradization. Abrams depends largely upon the helpful influence of light, of air, and also of the physician's suggestion upon the capacities of digestion.

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[1] Practitioner, January, 1905.

[2] Berliner klin. Woch., January 16, 1905.

[3] Medicine, October, 1904.

THE PLEURA.

The Diagnosis of Pleurisy has two aspects, as pointed out by G. A. Gibson, the examination of the patient by ordinary clinical and by x-ray methods, and that of the fluids (by cytology and bacteriology), and by thorough examination of the sputum, blood, and urine.

Physical Signs. *Grocco's Paravertebral Triangle of Dulness* is easily made out in the left chest when the pleural effusion is on the right side. It must be understood that this dulness is not to be compared in intensity with that obtained over the effusion, and that it is not suggestive of the presence of any fluid in the sound pleura. As a fact, it is merely a modification of the resonance of the normal contents of the latter.

Fig. 3

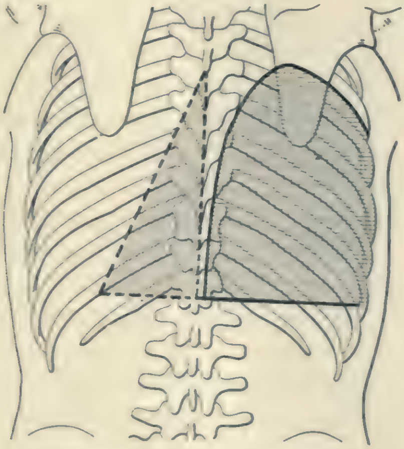

Diagram of Grocco's triangle.

A simple diagram is best suited to convey the description and the explanation. The position of Grocco's triangle is as follows: Let us imagine the presence of an effusion in the right chest; the well-known curve of the upper limit of dulness, which was first described by Damoiseau, determines the upper level or angle of Grocco's triangle. Its lower level is that of the twelfth rib and of the bottom of the pleural sinus. The outer angle varies, in its horizontal distance from the spine, between 6 and 10 cm.

It will be seen that the greatest width of this dull patch is much below the level of the cardiac dulness and of that of the liver. The level of the liver dulness need not be much altered, but there may be some lateral displacement of the heart to the left and a marked alteration in the right border of the cardiac dulness.

The explanation given by Grocco is based upon the anatomical factors.

It cannot be doubted that the mediastinum and its contents are more or less displaced into the sound chest, and thus exert some pressure upon the sound lung. Ferranini is of the opinion that the dulness is due to the pulmonary condensation caused by that visceral pressure. It is obvious, however, that the lower and broader part of the dulness is not due to any pressure from the heart or liver. I am, therefore, inclined to ascribe some of the dulness to a bulging of the more yielding prevertebral attachment of the posterior mediastinum, and of the distended pleura into the sound half of the thorax. This bulging would occur mainly below the level of the floor of the pericardium, where the prevertebral attachment is stronger, and it may entail a slight displacement of the œsophagus.

Grocco contends that the dulness which he has described is a safe test for the presence of pleural fluid, and that it affords a reliable estimate of its amount. Skiagraphy has established the fact that the level of the dulness corresponds with that of the fluid, but there does not seem to be sufficient proof that the dulness is due to the displacement and compression of the thoracic contents of the sound side.

Of the three papers which appeared during the past year on this subject, the most important is a report by Baduel and Siciliano[1] of experimental postmortem injections and dissections, as a substitute for the method of frozen sections, in a subject suffering from pleural effusion at the time of death. Their conclusions agree in every respect with those recently arrived at by my own clinical observations. The triangular dulness is produced by fluid only, whether pus or serum, and not by pulmonary consolidation or tumor, nor by plastic pleurisy. The essential change is the displacement of the posterior mediastinum, and this, as well as the cardiac displacement, is most marked when the effusion is on the right. The aorta is then pushed to the left of the bodies of the vertebræ; and this is a sufficient warning not to aspirate within the triangle. When the effusion is on the other side, the aorta is pushed from its left lateral into a median prevertebral position. The dulness is explained, not so much by the shifting of the heart and its appendages, as by the contact of fluid with a large section of the circumference of the vertebræ instead of the usual contact with inflated lung. This effectually deadens vibration in the vertebræ and in the ribs.

The shape of the prevertebral dulness is doubtless due to the fact pointed out by Baduel and Siciliano that at the base the pressure of the fluid acts on the walls of the pleura from the first and with progressive hydraulic force. The levels for their inspection of the visceral displacements were chosen at the second interspace and at the nipple only. We should note, moreover, that below the level of the heart, viz., below that of the ninth spinous process, the pleural sinus is more capable of distention (at the expense of the intestinal gases), and that the range of lateral mobility of the posterior mediastinum is greatest between the loose prevertebral attachments of the floor of the pericardium and the fixed point of the aortic foramen. It is here, therefore, that the lateral bagging would be greatest, as, indeed, it is shown to be by the width of the base of the triangle. But it should be pointed out that the bag of fluid could not stretch so far across the spinal column as to occupy the opposite spinal groove. We are dealing, then, not with immediate dulness of fluid, but with a transmitted dulness; and an aspiration, if it should ever be undertaken, under a misapprehension within Grocco's triangle, would merely wound a healthy lung.

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[1] Riv. Crit. di Clin. Med., January, 1904.

Percussion of the dorsal spines, which I have long practised habitually, is instructive in various practical directions, and, not least, perhaps, in a surgical direction. As regards the question of the signs of pleural effusion, I have found that unilateral effusion never confers absolute dulness upon the spine, but that double effusion always does render it dull.

Considerable light is thrown upon the causation of Damoiseau's curved line by the observation of Grocco. It might seem not only strange but contradictory that, whereas there exists a paravertebral dulness on the sound side, there should be found on the side of the effusion a relative paravertebral resonance for some distance below the upper level of the fluid. The explanation lies in the pleximetric function of the vertebræ. Partial contact with the collapsed lung renders them resonant in comparison with the dead dulness of the effusion, and partial contact with the bag of fluid damps their conducting power for vibrations, so as to render them dull as compared with the full resonance of the healthy side of the chest, over an area proportionate in extent to the broadening diameter of the collection.

In conclusion, the value of Grocco's sign is chiefly confirmatory, and it is somewhat limited by the fact that the dulness is least obvious in those cases where the effusion is not sufficiently large to ensure its own diagnosis. Moreover, it is more fully developed on one side than on the other. Nevertheless, it cannot fail to have its practical uses and should be kept under clinical study.

Inequality of the Pupils coincide with pleuritic effusions in a proportion of cases (7 out of 17) for some unexplained reason. We owe this observation to Chauffard and Laederich.[1] The inequality was slight and disappeared under the influence of positive accommodation or of a powerful light. It is probably the result of reflex dilatation on one side, possibly by inhibition of the light reflex. Souquers had previously described inequality as a result of tuberculosis of the apex of the lung, and Vincent a narrowing of one pupil from phlegmonous angina.

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[1] Arch. gén. de méd., March, 1905

Wals' Sign of Intrathoracic Tumor is brought to our notice again by M. Queirolo[1] at the Italian Congress in connection with a right pleural effusion in a woman, aged fifty-six years, suspected of tubercle. The two peculiar features which it presented included Wals' sign, namely, *increased measurement on the side free from effusion not due to previous deformity,* and hardly any displacement of the heart. The diagnosis of pleuropulmonary neoplasm, based upon this combination of signs, was verified after death.

Valsalva's Experiment has been used by Arthur Gröber, of Leipzig,[2] as a help in localizing intrathoracic disease. When the glottis is kept closed, and strenuous expiratory efforts are kept up, the jugular and superficial veins above and below the clavicle become turgid. Should, however, the patient be affected with unilateral disease of the upper intrathoracic region, the veins on that side will swell more and with greater rapidity than on the sound side. This test can easily be turned to account for the localization of the lesion on to the side affected. But it is clearly not one to be relied upon as conclusive, but merely as suggestive and confirmatory.

The Method of Estimating the Amount of a Pleuritic Effusion, which is described by Orazio Schifone,[3] but was originally devised by Niclot and adapted by Achard, is an ingenious modification of the well-known physiological colorimetric method. 30 c.c. having been withdrawn by aspiration, 1 c.c. of a 2.5 per cent. methylene blue solution is injected through the same needle, and the patient is made to vary his position. Five minutes later 30 c.c. are again withdrawn and the depth of color compared with that of a litre of water previously mixed with 1 c.c. of the same standard blue solution. The degree of dilution of the methylene blue in the chest can then be calculated. Additional devices are suggested to obtain a more accurate estimate. Schifone, who has tested the method in a series of cases, has found it to work exceedingly well.

Inoscopy, or Jousset's bacterioscopic method (1903), consists in collecting the bacilli in an exudate by coagulation, separating the clot and redissolving it by peptic digestion, and finally centrifugalizing the concentrated liquor. This has enabled him to find tubercle bacilli in 100 per cent. of pleurisies with effusion. P. S. Medovikoff,[4] who examined 6 cases, could find them only in half the number, or 50 per cent. Basilio

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[1] Sem. méd., November 2, 1904, p. 352.

[2] Ibid., February 6, 1905.

[3] Rif. Med., November 16, 1904.

[4] Roussky Vratch, October 16, 1904.

Bonardi[1] has given the test a more extensive trial and believes that it will find a permanent place among our clinical methods. Nevertheless, he obtained positive results in 35 per cent. only of all cases, and the exudate failed to yield bacilli in cases where there existed multiple localizations of tubercle.

CYTODIAGNOSIS, which was elaborated by Widal and Ravaut in 1900 on the basis of the methods introduced by Ehrlich in 1880, is ably reviewed in an editorial,[2] which discusses some of its vicissitudes in connection with the study of pleural exudates and in particular with the recent contributions of Lewkowicz[3] and of Musgrave.[4] The latter has been able to confirm the original lymphocytic formula of the French observers in 22 out of 23 cases of primary tuberculosis of the pleura; the polynuclear formula, according to them, bearing the significance of a mixed or secondary infection with the ordinary pus formers, and endothelial formula denoting a simple transudate, or a traumatic effusion.

According to G. A. Gibson,[5] *a large and early lymphocytosis* in association with leucopenia suggests tubercle. Polynuclear neutrophiles and lymphocytes (the latter usually predominating) are found with a varying proportion of endothelia and blood cells with the help of centrifuge and of Jenner's stain. Of 118 cases of pleurisy, 65 were dry, 38 were serous, and 6 purulent; Koch's bacillus was found in 35 (29 per cent.); the pneumococcus in 27 (22 per cent.); and 34 cases did not reveal their etiology.

A painstaking examination of 41 cases of pleural effusion enables Herbert S. Carter[6] to draw attention to the complicating difficulties inherent to cytodiagnosis. Specific gravity, proportion of fibrin and of albumin, body temperature, and their variations need to be taken into account, as well as the proportions and variations of the cytological elements. Although tubercle can be diagnosed when a high temperature coincides with a lymphocytosis, with a high specific gravity, 1012 to 1024, and with an abundance of fibrin and albumin, the fact that pleural transudates also presents a lymphocytosis precludes our relying upon mere cell counts for a safe diagnosis.

The Cytology of Pleural Effusions has recently been worked at also by Vargas-Suarez,[7] who enters largely into the question as to the origin of the lymphocytes. It is noteworthy that lymphocytes were in large excess in 15 idiopathic pleurisies, but almost absent in a tuberculous and in a rheumatic case which were examined by him.

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[1] Gaz. degli Osped., July 24, 1904.

[2] Journal of the American Medical Association, November 12, 1904.

[3] Wiener klin. Woch., Bd. xvii., No. 37.

[4] Boston Medical and Surgical Journal, vol. cli., Nos. 12, 13, and 14.

[5] British Medical Journal, January 7, 1905.

[6] Medical News, October 1, 1904.

[7] Beiträge zur klinik. der Tuberculose, 1904, Bd. ii., 201.

THE TREATMENT OF PLEURISY AND OF THE EFFUSION. Important discussions have been held on this large subject, particularly with reference to effusion. Immobilization of the side affected, for which Lankester[1] recommends long strips (two inches wide) of oxide of zinc plaster in preference to the old rubber adhesive plaster, because it sets up little or no erythema, is, as well as the bleeding which he also recommends, exclusively applicable to the non-exudative form or to the dry stage. Although a strong case can be made out in favor of immobilization in the tuberculous variety, in connection with the accepted precept of "rest for tubercle," clinical instinct prompts one in early cases to chose the lesser evil, and to keep the visceral pleura moving, though this may slightly prolong the pyrexial stage, with the excuse that the affection may be said to invariably recover, and that any reasonable risk ought to be taken which can obviate the formation or the tightening up of adhesions. In the frankly rheumatic case there can be no hesitation in abstaining from a device which is as troublesome as it is unnecessary. Local leeching is the best remedy for this pain, and for the disease itself; and there are other topical anodynes, such as local heat or cold, medicated applications, and posture itself, to say nothing of the simplest of all pain killers, a hypodermic injection of morphine, to tide over the few hours' interval before effusion gives relief, or our antiphlogistic measures have taken effect.

The discussion at the Oxford Meeting of the British Medical Association did not elicit much novelty, but a good representation of prevalent practice. *Early withdrawal of the fluid,* if necessary to be repeated, not as an adjunct, but as an essential of treatment, and careful after-treatment in view of the risk of latent tuberculization; these are requisites, duly insisted upon by Osler, which are emphatically to be endorsed. I cannot feel sure that pneumothorax is so rare after thoracentesis as he seems to believe. Probably it is often overlooked because not looked for, and because it is not apt to set up any symptoms so long as the patient lies quiet. I have witnessed it repeatedly of late. The fact that it does occur, and this has also been noted by Schlesinger[2] in his thorough discussion of the treatment of effusion, is an argument in favor of the adoption of Forlanini's method of evacuation, the advantages of which were dwelt upon in last September's volume of PROGRESSIVE MEDICINE.

The same report also refers to J. Barr's *intrapleural injections of adrenalin solution* after paracentesis.

For Delaying Thoracentesis, at least in the case of children, we have the well-known inducement that in them effusions are very often quickly reabsorbed, as stated by T. D. Acland; and the further excuse that their lungs will readily re-expand, even after persistent compression. The transient character of the "Ephemeral Pericardial Effusions," which I have described, is an analogous instance; and effusions in the peritoneum and in the subarachnoid and ventricular spaces furnish us with further object lessons for delay. Nevertheless, my present feeling is that, in presence of the fact that in the case of thoracentesis, the attendant risk is almost *nil*, the encumbrance of an unhealthy fluid should be removed, unless it can be shown that the slow reabsorption of a quantity of "materia peccans" can serve prophylaxis or promote immunity. Delafield's[1] statistical study of the after-history of tapped pleurisies and of those not tapped is well worth extending by others, with a view to further confirming his advocacy of early paracentesis.

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[1] St. Paul Medical Journal, July, 1904.

[2] Medical Press, March 15, 1905, p. 273.

Gilbert's Method of Auto-serum Therapy in Pleuritic Effusion, which has been tried in a series of cases by Michele Landolfi,[2] appears to have had a precursor in an analogous method applied by Debove and Rémond in tuberculous peritonitis. The ease and harmlessness of the procedure, which consists in withdrawing a small amount of the fluid from the patient's chest and injecting it into his circulation, are recommendations of a negative kind; and it is difficult to think that the injection of this fluid into the blood can have any beneficial effect whatever. Still, Landolfi believes that the method may arrest the tuberculous process or prevent recurrence, and that it should be used in all cases of pleurisy with effusion.

Re-expansion of the Collapsed Lung by the early adoption of respiratory exercises was insisted upon by Osler.[3] The same end can be promoted by posture, the patient being placed on his sound side immediately after tapping, in order to bring the other lung into action. This was part of the systematic after-treatment of pleural effusion which I described some years ago before the London Polyclinic. Open-air treatment is, of course, indispensable in all cases due to tubercle. For the diagnosis of the rheumatic variety, G. A. Gibson recommends that the urine should be examined for the presence of the diplococcus of rheumatism. He has found treatment by tuberculin to be useful in some cases.

The Usefulness of Medication is but faintly believed in by Osler and not at all by R. W. Philip. But we can hardly afford to indulge in skepticism, in face of some of the achievements of mercury in tuberculous peritonitis and in various forms of arthritis, and of the salicylates and of diuretics in rheumatic effusions. Our rapid methods seem to have made us less thankful for smaller mercies. But it is worth noting that the value of salicylates in the treatment of pleurisy with effusion is dwelt upon by Le Waschew[1] among other advocates.

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[1] American Journal of the Medical Sciences, December, 1902.

[2] Rif. Med., July 27, 1904.

[3] Loc. cit.

The Merits of the Chlorides and of Clinical Dechloridation have not yet been satisfactorily determined. We are in danger of being confused as to the main points by the multitude of side issues which have been raised in connection with more or less strictly scientific observations. But Chauffard and Bodin's observations in the treatment of pleuritic effusion lead them to recommend a strict milk diet, because it not only excites diuresis, but promotes the "chloride crisis," or increased urinary excretion of chlorides which is associated with the natural process of resorption of the effusion. During that period any additional chlorides in the diet are not retained as at the height of the exudative process, favoring œdema and venous stasis, but pass out freely.

Chylothorax. A case of milky effusion into the left pleural cavity is reported by P. I. Kozlefsky. The patient, a young lad, had two attacks of syphilitic hemiplegia. The effusion, which occurred after removal of 2000 c.c. (the patient dying after leaving the hospital), may, therefore, have been due to syphilitic intrathoracic disease.

Traumatic Chylothorax is the theme of two interesting papers. A. Dietze[2] adds to 9 cases which he has collected from the literature, a tenth case, the first of the reported cases caused by a bullet wound. Right-sided effusion was recognized on the sixth day, though dyspnœa had begun on the third. The chest was tapped on the tenth day, 1500 c.c. being withdrawn, and again 2350 c.c. on the fourteenth day; and six further aspirations within seventeen days removed a total of 19,400 c.c. But only two more aspirations at longer intervals were necessary. Dietze advises this, as direct suction is exerted by aspiration, the operation should always be delayed as long as the urgency of dyspnœa will permit. But in cases of rapid reaccumulation, thoracotomy with costal resection would do away with the suction and encourage healing.

F. Munch[3] endorses tentatively the same suggestions after discussing the symptoms. The simpler and less severe proceeding which I would venture to suggest, at any rate for trial, in all cases of this kind, is a resort to Forlanini's principle of substituting air for fluid, with the essential modification that the chest should not be emptied by aspiration, but by siphonage, a separate cannula being introduced for the supply of aseptic air.

In the case of an infant of eighteen months reported by M. N. Filippov,[4] probably the youngest case on record, thoracotomy was followed by the usual series of reaccumulations and by death from exhaustion. Had air been introduced into the pleura, the result might, perhaps, have been less disastrous.

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[1] Wiener med. Presse, 1904, Nos. 37 et 38.

[2] Deutsche Zeitschrift f. Chir., June, 1904.

[3] Semaine méd., August 10, 1904.

[4] Prakt. Vratch, September 18, 1904; Semaine méd., November 2, 1904

Pneumothorax. *Traumatic Pneumothorax from Thoracentesis* is, as already stated, not an infrequent result in my experience, confirmed by that of Schlesinger. A puncture is inflicted upon a collapsed lung; and the next event is forcible expansion of the latter by aspiration. The resulting pneumothorax would probably be more often detected if the chest were examined at once. The condition rapidly cures itself, but it would more easily be avoided if siphonage were used instead of aspiration, and the outer air admitted into the chest.

The Production of Pneumothorax is no Objection to, but part of the technique of various thoracic operations or explorations. Cavazanni[1] has used it systematically to obtain better access to pulmonary abscesses or gangrene.

The Treatment of Pyopneumothorax formulated long ago by Samuel West[2] is now restated by him as follows: 1. Early stage: Deflation by paracentesis (never by aspiration, which West considers to be dangerous in pneumothorax), to be repeated, if required; and failing relief, pleurotomy, if there should be any urgent indication. 2. Later stage: Tentative tapping, to ascertain the nature of the fluid. If this should be serous, the treatment should be framed on the same plan as that of serous pleurisy; if purulent, the chest should be at once incised and drained, without resection of ribs, unless found to be indispensable.

For urgent cases too ill to submit to the risks of anæsthesia, William Turner[3] recommends in preference to aspiration the introduction of a trocar and cannula under local anæsthesia. The complete operation for empyema, including rib resection, can then be delayed for a few days, and meanwhile the advantage of drainage is secured.

The Diaphragm. CONGENITAL DIAPHRAGMATIC HERNIA, AS WELL AS THE ACQUIRED VARIETY (including the traumatic), is considered by R. L. Knaggs[4] more especially in connection with volvulus of the stomach, which is apt to arise from torsion of the small omentum. Among the physical signs which may suggest the presence of this condition, he mentions (*a*) rumbling noises in the chest due to stomach or bowel, (*b*) peristaltic movements perceptible through the intercostal spaces, (*c*) lateral displacement of the heart, (*d*) suppression of the breath sounds, (*e*) unilateral alteration in shape and deficiency of movement of the thorax, (*f*) inability to lie on the sound side, (*g*) depression of the epigastrium, and (*h*) distention of the stomach, sometimes to an extreme degree.

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[1] Rif. Med., 1904, Bd. xx.

[2] Lancet, October 22, 1904.

[3] Ibid., April 15, 1905.

[4] Ibid., August 6, 1904.

TRAUMATIC HERNIA THROUGH THE DIAPHRAGM. In the man seen by H. B. G. Newham[1] soon after a fall of thirty feet, which had caused extensive bruising, but no thoracic fracture, the stomach and part of the colon occupied the left half of the thorax, displacing the heart to the right. The tear in the diaphragm was supposed to have been produced by sudden and violent muscular contraction. The patient survived two days, in spite of much precordial and subsequent abdominal pain.

THE LUNGS.

Physical Signs and Physical Methods of Examination. CLINICAL DERMOGRAPHY is much facilitated by Stacy Wilson's[2] device of rubbing on the skin a little zinc oxide, such as is used as a hospital dusting powder. This enables the skin to receive from silver, German silver, and similar metals, a good, dark impression. Skin so treated can be easily and darkly marked by a silver coin. This reaction of the skin might chance to be mistaken in the case of paralyzed limbs for a trophic change due to the paralysis.

PERCUSSION. *Immediate Percussion of the Chest with One Finger*, recently practised with gratifying success by Ernesto Caccianiga,[3] is the final type of irreducible simplicity, which would long ago have been universally adopted, but for the complicating factors of varying tenderness in the percussed, and varying lightness of hand in the percussor. These are eliminated when percussion is performed not from the wrist, but from the proximal finger-joint. It is then strictly a "finger percussion." I can confirm Caccianiga's favorable account of this method, which I have long employed, but only over the subcutaneous bony surfaces, and without excluding wrist movement. I have also learned that one finger is better than two. Inasmuch as precision in delimitation is proportionate to the lightness of the blow, this is of all methods that likely to provide most rapidly a helpless percussor, not only with fine results, but with the first essential in the technique, viz., a stroke so gentle that the most delicate patient will not resent it.

Immediate percussion is also practised by M. A. Fränkel,[4] only not with the finger, but with a small hammer.

AUSCULTATION. *An Elementary Appreciation of Pitch* is indispensable to efficient auscultation, even more than to percussion, which elicits the tactile vibrations, as well as the sonorous. A. J. Steven's[5] letter and Quimby's[6] paper, to which it refers, both reflect the confusion which has resulted from individual inadequacies in the appreciation of sounds, and from the ill-tutored use of acoustic terms. Is the inspiratory pitch or is the expiratory pitch the higher of the two? That is the question. Its discussion would occupy too much space here, but it may be of use to point out that high harmonics are better perceived by some than lower sounds, and that to those ears, if not exceedingly attentive, the lower ground tones might thus appear to possess the higher pitch.

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[1] Lancet, December 24, 1904.

[2] British Medical Journal, March 5, 1905.

[3] Gazz. degli Osp., October 23, 1904.

[4] Sem. méd., January 18, 1905.

[5] Journal of the American Medical Association, November 26, 1904, p. 1629.

[6] Ibid., October 1, 1904.

The Reverberator suggested by Stacy Wilson[1] for the easier detection of the "Bell Sound" in chest or abdomen is essentially the same as Reichmann's rod, viz., a short cylindrical bone rod, about one and a half inches long and three-eighths of an inch in diameter; its lower end rounded for close apposition to the surface; the upper end flat and roughened, so that loud and regular vibrations can be set up by scratching. The area of the subjacent viscus can be very sharply defined. Much information can be gained if the scratching be kept up continuously. In ascites with distended stomach, the pitch of the reverberation rises with each inspiration and falls with each expiration, owing to the varying tension of the gas. Of still greater use is the change in the pitch of the note, which results from the peristaltic action of the viscus concerned; for instance, in the stomach, as the wave of contraction passes from cardia to pylorus. Useful information can often be gained by the same method in intestinal obstruction.

PHYSICAL SIGNS IN INFANTS AND CHILDREN. Samuel McC. Hamill and Theodore Le Boutillier[2] call attention to certain normal conditions usually overlooked in pulmonary percussion and auscultation.

1. *An Area of Impaired Resonance under the Inner Third of the Left Clavicle* was first noted accidentally; but on investigation it was found by them to be the rule in healthy children up to the age of nine or ten years, or even later, though varying in its degree, and also in its extension beyond the first interspace, sometimes as far as the cardiac dulness. The only explanation which they could find seems to be a probable one, viz., the relatively exposed condition of the great vessels in the manubrial region, particularly to the left of the middle line. As the chest becomes deeper and the lungs more bulky with advancing growth and muscular development, the difference between the two sides becomes less marked. The existence of a prevascular dulness above the precordial dulness was pointed out many years ago by the present writer in his "Cardiac Outlines," and also its want of symmetry and its extension to the left. The accentuation of this asymmetry in juvenile chests is an important addition to practical semeiology.

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[1] British Medical Journal, March 25, 1905.

[2] Journal of the American Medical Association, January 7, 1905.

2. *The Variability of the Normal Area of Transmission of Bronchial Breathing* beyond its usual site at the interscapular and supraspinous regions, and its extension in some children to the entire scapular and even to the lower axillary region is another practical matter not to be overlooked. Posture and pressure may have much to do with the abnormality in question.

3. *The Influence of Position* is also great in modifying the percussion note in infants. Lateral decubitus is apt to mislead by its tendency to raise the pitch of the percussion note in the dependent lung partly compressed, and no longer served by the elasticity of the chest wall.

PALPATION. *Vocal Fremitus.* If, as William N. Berkeley[1] contends, this has been neglected in recent clinical work, it should be again made prominent in our teaching. It is of special educational value to the student in the most important of all his physical-sign training, that of palpation. For that reason, I would venture the suggestion that not only the four fingers of the best trained hand, but the palm also, and particularly the highly discriminating *ulnar pad,* so convenient to use edgewise for accurate localization, should be applied to the chest, and that the student should have the perseverance to practice bimanual palpation (crossed hands being used as a check) until either hand has become "the best hand."

The Use of the Tuning Fork, so often suggested in auscultation, is again proposed as an aid in diagnosis by Chiret and Mores[2] for the earlier detection of osteoarticular affections, and might, therefore, find its application in suspected disease of the thoracic vertebræ. While sound bone is almost insensitive to the vibrations of a large tuning fork (25 cm. in length), they produce shaking, trembling, electric or burning sensations in diseased bones.

INSPECTION. *The Phrenic Wave.* The practical value of Litten's "diaphragm phenomenon" in diagnosis has found a staunch advocate in William N. Berkeley.[3] As regards the name, it is impossible not to agree with his contention that "phrenic wave" is shorter and more descriptive, and that it may be justifiable to speak of Litten's "wave," although the "shadow" which is given by the wave was originally introduced to our notice. The wave seen to travel up and down the lower intercostal spaces in lean and active breathers is an ocular demonstration of the movements of the lower fringe of the lung and of the anterior surface of the diaphragm. Berkeley points out that its marked diminution in front on both sides, together with its marked persistence behind, is characteristic of emphysema and of asthma. But the best clinical value is found in its unilateral variations. Its complete or almost complete absence on one side only may afford valuable confirmation to other signs of various unilateral affections, such as pleurisy or tuberculous disease, which is so apt to lessen the excursion of the diaphragm and other conditions. The absence of a visible phrenic wave on both sides cannot be used as a basis for any clinical conclusions, unless the subject had previously presented good waves.

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[1] Medical News, May 28, 1904.

[2] Presse méd., 1904, Bd. i., No. 47.

[3] New York Medical Journal, February 4, 1905.

On the other hand, the study of Litten's phenomenon is an excellent exercise for the student. It also has much value for the physiologist, who possesses in it an automatic and truly scientific record of the normal movements of the diaphragm and of the base of the lung, absolutely free from any adulteration or experimental error. In life insurance examinations the phrenic wave may acquire considerable importance. The vertical range of pulmonary expansion is a test not less telling than the horizontal or circumferential range, and this the phrenic wave may supply without the expense or trouble of *x*-ray examinations. A wave excursion of not less than three inches on both sides would be a sufficient proof of pulmonary health and efficiency.

Dissociated Respiration is the felicitous term applied by P. Grocco,[1] of Florence, to the altered combination of thoracic and abdominal breathing. Loss of their strict physiological co-ordination is specially frequent in medullary and cerebral lesions and affections, and in severe diseases and toxæmiæ.

THE BRONCHI.

"The Nursing Bottle to Arrest Coughing," recommended by Rahn in the *Correspondezblatt*, sounds like a trivial remedy for a minor ailment. Its scope and its importance are in reality considerable. In all serious states threatening to impair the function of swallowing the feeding bottle is a help and facilitates and regulates deglutition, and lessens the risk of inhalation pneumonia. I have found a good substitute for it in an india-rubber tubing of very small bore and great thickness attached to the spout of the feeder, so as to ensure slow delivery of fluid without any risk of kinking or compression by the teeth.

Fibrinous Bronchitis varies much in type and in the severity of its symptoms. It probably varies also in its pathology. This diversity is well brought out by G. Liebermeister's[2] study of the composition of the casts obtained from a series of cases besides the cases which he contributes. Purely mucous casts are familiar objects. But within the "fibrinous" category must be included not only purely fibrinous casts, but also those in which both constitutents are variously combined.

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[1] Rif. Med., xx., No. 24, 1904.

[2] Deutsche Arch. f. klin. Med., vol. lxxx. p. 551.

The treatment suggested by Moser[1] for an acute suffocative attack includes the inhalation of oxygen, steam inhalation, codeine, and creosote. The latter is, in his opinion, of much value during the intervals. The most rapid results are probably to be expected from intratracheal methods; but these are not free from risks and need technical experience as well as judgment. Iodide of potassium is probably the best of our internal remedies.

In an unusual case of *Relapsing Pneumococcus Fibrinous Bronchitis* in a child reported by Ménétrier,[2] the first attack lasting three months, began eight days after birth, a second attack of the same duration at four months, and a third, which was apparently shortened by iodide of potassium and creosote, at the age of two years.

Pneumococcal Bronchiolitis, described by C. P. Clark and F. H. Batman[3] in a man, aged twenty-one years, whose lungs presented very little implication of the alveoli, and none of the large tubes, but whose bronchioles were all affected in both lungs, must presumably be classed as an intermediate form between lobar pneumonia and the "primary bronchopneumonia" of Samuel West. The clinical diagnosis had been "pneumonia, probably with miliary tuberculosis."

Primary Pneumococcus Bronchopneumonia is held by Samuel West[4] to be of frequent occurrence in infancy and early childhood, a view in which J. A. Coutts[5] cannot agree. P. Stanley Blaker[6] takes up an intermediate position in regarding primary bronchopneumonia as almost limited to the first twelvemonth. Secondary bronchopneumonia and the croupous variety as more common afterward. Lobar pneumonia then becomes the more common of the two affections; but in cases dying after seven or ten days secondary bronchopneumonic patches are usually found, and their presence may account for the divergent opinions expressed. General clinical experience will probably agree with my own that the pneumococcus bronchopneumonia brought to our notice by West was previously misunderstood, and will be in the future recognized as frequent; West says "very frequent." In his own words, "acute pneumococcal inflammation of the lungs tends in the child to take the patchy or disseminated form, and thus to be confused with ordinary bronchopneumonia."

The terms *suffocative catarrh* and *acute congestive bronchopneumonia* have been misapplied, according to West,[7] and great confusion has been the result. True "suffocative catarrh" is bronchiolitis or capillary bronchitis. "Acute pulmonary congestion," sudden and fatal in a few hours, is pneumonia at its earliest stage, and clinically as well as pathologically distinct. In view of the importance of this subject and of the prevailing uncertainty as to the meaning of our terms, West's tabulated classification will be a help:

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[1] Medical Record, August 6, 1905.

[2] Soc. méd. des hôp. de Paris, December 9, 1904.

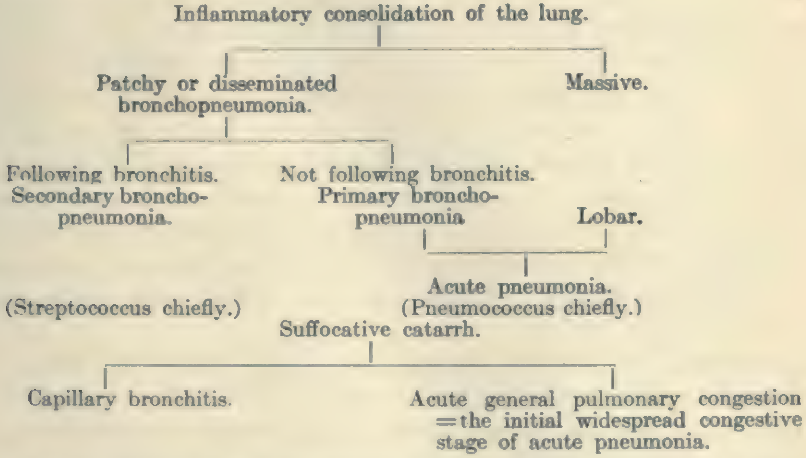
[3] Journal of Infectious Diseases, Chicago, March 19, 1904.

[4] British Medical Journal, October 8, 1904.

[5] Ibid., October 29, 1904.

[6] Ibid., November 25, 1904.

[7] Ibid., December 3, 1904.


Inflammatory consolidation of the lung.
Patchy or disseminated bronchopneumonia.
Massive.
Following bronchitis. Secondary bronchopneumonia.
Not following bronchitis. Primary bronchopneumonia
Lobar.
Acute pneumonia.
(Streptococcus chiefly.)
(Pneumococcus chiefly.)
Suffocative catarrh.
Capillary bronchitis.
Acute general pulmonary congestion =the initial widespread congestive stage of acute pneumonia.

The Treatment of Bronchopneumonia in Children, as laid down by W. P. Northrup,[1] is a resultant of hygiene and common sense; fresh air and water; no antipyretics; hot foot-baths and hot salines; whiskey and strychnine as heart stimulants; add no other drugs. To these might perhaps be added another good old remedy, recently again recommended by J. Pinto,[2] the cold compress frequently renewed.

Pulmonary Congestion as a Cause of Sudden Death has not received much recognition of late years from clinical authorities. W. W. Miner,[3] who reports 3 cases, partly bases his views as to their etiology upon the statement that horses frequently die of this affection. I have never witnessed this occurrence in the midst of perfect health, apart from the action of poisons; but of the occasional supervention of acute pulmonary congestion in early renal disease I have no doubt. It is not improbable that a bacteriological examination would identify most of these fulminant cases as instances of acute pneumococcus congestion.

Asthma. The Tracheal Traction Test is described by A. Abrams[4] as an aid in the recognition of the "idiopathic" bronchial asthma, for this is the only condition in which extension of the trachea, by raising the chin high, fails to induce a definite change in the percussion note of the manubrium. When the chin is bent upon the sternum the note is always resonant; when the neck is extended the note becomes in all subjects less resonant or even dull, even in the presence of pulmonary disease. Abrams considers that this is due to a reflex contraction of the bronchial muscle and to the resulting tension of the air in the trachea and bronchi. But in idiopathic asthma there is no change; and Abrams concludes that the tonicity of the bronchial muscle is so much reduced that it no longer responds to stimulation of the vagus. A simpler explanation might suit the facts stated by Abrams. Except with the closed glottis no rise in air tension could take place. As a fact, if percussion be applied to the trachea itself or even to the larynx, the same changes of pitch will be obtained. Supposing the rise in pitch were due to the increased tension of the tracheal membrane itself, just as stretching the membrane raises the pitch of a drum, then no rise would be expected where the cartilaginous rings had already been drawn taut, and this must be the case in the asthma paroxysm if it is a fact that the bronchial muscle is then in a state of tonic contraction.

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[1] Medical News, April 30, 1904.

[2] Brazil Medico, xviii., No. 1.

[3] Boston Medical and Surgical Journal, December 22, 1904.

[4] Medical News, June 25, 1904.

FOR THE TREATMENT OF ASTHMA, Bahadurja[1] reports excellent results from three daily doses of 5 minims of adrenalin solution continued for one to three months. W. F. Wagner[2] has been able to relieve the paroxysms, although not to cure the disease, by a subcutaneous injection (sometimes repeated in a few hours) of from 2 to 10 drops of the solution of adrenalin. The editor's comment in the *Therapeutic Gazette* upon the risks of this mode of treatment I can endorse. The pulse is tense during the paroxysm, and any additional tension may be too much for the wearied heart.

In the discussion on Greville Macdonald's paper,[3] who believes that in a few years "every general practitioner will use the cautery" for asthma, not a few speakers declared that the method had not been successful in some of the cases, and Samuel West dwelt upon the analogy between the epileptic and the asthmatic predisposition, which is open to irritations capable of arising from various parts of the body. Though relief may be given, this circumstance greatly limits the prospects of a cure.

In view of the "unreckonable individual factor" in connection with the action of climate, G. Avellis[4] considers that the best climate may perhaps be found in a sanatorium under enlightened management, for the sake of the regulation of the nerves and of the nervous system, and of another factor, the importance of which cannot be gainsaid, that of therapeutic suggestion.

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[1] Indian Medical Gazette, December, 1904; Therapeutic Gazette, 1905, p. 97.

[2] Journal of the American Medical Association, February 11, 1903, p. 498.

[3] British Medical Journal, November 5, 1904.

[4] Münch. med. Woch., November 15, 1904, Bd. li., No. 46.

In a letter to the *Therapeutic Gazette* (p. 216, 1905), Francis Hare reminds us of the view which he has published[1] long ago, that asthma is one of a long series of closely allied vasomotor neuroses, and that cauterization of the nasal mucosa might be expected, as now shown by Alexander Francis and by W. N. Robertson, to have much wider potentialities than the relief of the one neurosis only. They have found it to be of value in some cases of angina pectoris and of epilepsy, and in one case of migraine. In this connection, it is interesting to note that G. Kolischer[2] has failed to be convinced of the reality of so-called "nasal dysmenorrhœa," and has been disappointed in the results of the "Fliess treatment."

In Infantile Asthma, La Fétra[3] has had good results from small and repeated doses of a mixture of tartarated antimony, epecacuanha, and nitroglycerin. He has also given successfully $\frac{1}{2000}$ of a grain of atropine every two hours until the face becomes flushed (this usually occurs after two or three doses).

THE PERICARDIUM.

The Treatment of Acute Pericarditis, when complicated by effusion, often calls for special experience, both in the physician and the surgeon, which it is not easy to command, as the affection is not so common as to be always available for study. H. Edwin Lewis[4] gives large and repeated doses of saturated solution of Epsom salts in preference to antirheumatics or tonics and stimulants, unless these should be indispensable. Dry cupping or counterirritation are useful for the pain, and rest in "as prone a position as possible" is recommended.

THE TREATMENT OF THE EFFUSION would be a perplexity, but for two circumstances: the usually prevailing rapidity of spontaneous reabsorption, and the want which is still felt of a truly satisfactory surgical procedure. Were the latter absolutely simple and without risk, who would delay giving immediate relief to an oppressed heart? Punctures are not safe or reliable, incision is apt to grow into a larger operation than originally contemplated, or, indeed, required. Our hand may be forced by the urgency of the dyspnœa, a contingency more habitual in the uræmic than in the rheumatic conditions. Perhaps in the latter the prolonged distention of the pericardium, with assured protection from adhesions, is a less evil than irritation by rough friction of an acutely congested membrane pouring out fibrin and too readily blood also, with the prospect of agglutination. The pericardium is in all respects *sui generis* among serous membranes, and does not lend itself to conclusions from analogy. To some extent we can govern the movements of the lung; those of the heart are beyond our control, and there is no rest for them. We should not forget, too, that a pressure so evenly applied as is hydraulic pressure gives some support to vessels inclined to active dilatation. These are some of the considerations that mitigate our regret in our doubts and ignorance. A more useful solace is the exercise of our protecting power against the major evil of hyperfibrinosis. Salicylates are depressing and must be avoided or handled lightly; but there is no risk and great advantage in diaphoretics and in the administration of the citrates and of potassium iodide. The strength of the heart must be kept up without interfering with its rhythm. In this respect, strychnine and other supporting tonics may be preferred to digitalis, though very small doses of the latter would probably do good. Much remains to be learned before we can boast of being able to check or forestall the occurrence of rheumatic agglutination, which is often more disastrous than the valvulitis due to the same infection.

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[1] The Mechanism of the Paroxysmal Neuroses, Australasian Medical Gazette, 1893.

[2] American Journal of Obstetrics, June, 1904.

[3] Arch. of Pedriatrics; Journal American Medical Association, January 14, 1905.

[4] Medical Record, September 24, 1904.

PERICARDIOCENTESIS. The fallacy that the heart sinks in an accumulation of pericardial fluid is difficult to root up from clinical literature. It is again alleged in a paper by Doebert,[1] in support of his recommendation—a good one in itself—to keep the patient's head and chest raised during exploration "to prevent the fluid from gravitating back." To expose this misconception in the postmortem room, it is only necessary to take a cupful of blood, which is much heavier than serum, and to drop into it a child's heart ligatured with its contents. *Of course, the heart will sink.* Doebert rather favors a right-sided puncture.

Uncomplicated Tuberculous Pericarditis, as a single isolated manifestation of tubercle, has rarely been reported, only seven times, according to G. Scaglios.[2] His one case was that of a woman, aged sixty years, who died of pyelonephritis. None of the organs and tissues examined microscopically presented any tubercles, except the pericardium, where they were well marked.

Pneumopericardium is almost a rarity in our clinics, since Walter B. James[3] can only find 37 well-reported cases anterior to that which he relates. It is not difficult to diagnose, as it is loudly forced upon our notice by the extraordinary "churning sound" (Meigs), well known also as the "water-wheel sound," "bruit de moulin a eau," "bruit de la roue hydraulique," etc. In its perfect production it is quite diagnostic; but it may be partly imitated by the occasionally reported "heart's action splash" in cases of pneumothorax. James furnishes a tabulated list of cases. Among 11 patients who recovered, 4 had stab wounds, and 4 no external perforating wound, and, therefore, probably some internal injury from the fall, blow, or crush reported.

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[1] Berliner klin. Woch., May 2, 1904.

[2] Deutsche med. Woch., 1904, Bd. xxx.

[3] American Medicine, July 2, 1904.

Pericarditic Pseudocirrhosis of the Liver. The chief contribution to this subject is from F. Schupfer.[1] He distinguishes two clinical groups among the bearers of pericardial adhesions, "the asystolic" and "the pseudocirrhotic." The former has slight ascites and general œdema, the latter great and recurrent ascites and no general œdema. The severity of the ascites is the outcome, not of cardiac alcoholic, syphilitic, or other cirrhoses, but of chronic peritonitis. That is the primary cause of the ascites, coupled with changes in the centrum tenebrum. The existing pericarditis predisposes to ascites in the degree of its weakening effect upon the circulation. The pleuræ, especially the right, may also suffer effusion; but "polyseritis" is the exception. Thus a cirrhosis might possibly be present and yet not be truly responsible for the ascites. The existence of "Anascitic Cirrhosis of the Liver," recently brought up again under this new title, proves this point.

THE HEART.

The Estimation of the Functional Capacity of the Heart. The inherent fault of most of the tests which have been proposed for the estimation of the functional capacity of the heart resides, as pointed out by George W. Norris,[2] in the fact that no allowance is made for psychic and for the visceral effects, the importance of which cannot be denied. This defect also attaches to Graupner's method, which is based upon a determination of the reaction of the pulse, of the blood pressure, and of the size of the heart to the performance of a measured amount of work.

HERZ'S ARM-FLEXION TEST. A very simple manœuvre has recently been proposed by M. Herz[3] for ascertaining the functional integrity of the heart. The patient's right elbow is supported upon the observer's hand, while the other hand lightly grasps his wrist. The patient is then requested to concentrate his attention upon the performance of a very slow and uniform flexion of the forearm, which should not be resisted by the observer, but carried out by the patient with the least possible effort, and this is to be followed by an equally slow and gradual extension. The pulse which had previously been counted is again counted immediately after the extension. If the patient's myocardium is not absolutely sound a marked difference will be noted, in the shape of a slowing of the rate and of an increase in the size and the strength of the pulse wave; whereas, the pulse of a perfectly healthy subject will only present a very slight acceleration and no other change. Herz's interpretation of this reaction calls to aid a reflex starting from the cerebral zone of attention and reaching the heart through the medulla and the vagus. The undue excitability of weakness is revealed in the response of the latter to a trifling stimulus, just as this happens in the case of a dose of digitalis of which the normal heart takes no notice whatever. Whatever eventually may prove to be the practical value of this test, its simplicity is a recommendation.

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[1] Rif. Med., March 2, 1904.

[2] Medical Notes and Queries, January, 1905, p. 9.

[3] Deutsche med. Woch., February 9, 1905.

A Direct Registration of the Heart Sounds has been attempted by O. Frank[1] by means of a tambour and of photography. The description of this ingenious contrivance should be read in the original.

FIRST SOUND REDUPLICATION HEARD CLOSE TO THE APEX as distinct from the "bruit de galop" is regarded by M. Labougle[2] as an early sign of cardiac fatigue. Its distinctive features are its variability, its unaccountable disappearance at times, and its marked dependence upon posture, for it is apt to be temporarily suppressed by dorsal recumbency. It is an evidence of asthenia rather than of disease.

Heart Murmurs. THE DIASTOLIC MURMUR IN DIAGNOSIS. The chief conditions under which we expect to hear a diastolic murmur are aortic and pulmonary insufficiency, persistent ductus arteriosus, aneurysm, mitral stenosis, pericardial and pleuropericardial complications, and cardiorespiratory influences.

In respect to diagnosis this is the most important of all murmurs, but it happens to be that most apt to elude the stethoscope. It is well that Austin W. Hollis[3] should have entered fully into the study of its diagnosis. I find it a golden rule never to pronounce a doubtful second sound free from aortic regurgitation before using the rigid stethoscope.

THE MECHANISM OF THE AORTIC VALVES IN HEALTH AND IN DISEASE. A useful method has been adopted by R. G. Ewart,[4] of Manchester. He has constructed a scheme of the aortic valves with the help of a glass box, through which a stream of blood can be passed between the valves, while any resulting eddies and any sounds produced can be noted. He finds that, in cases of serious valvular destruction, varying motions occur behind and in the neighborhood of the damaged cusps, which materially assist in lessening the regurgitant effect of the valve deficiency.

PULMONARY REGURGITATION. *The Diastolic Murmur of High Tension in the Pulmonary Artery,* described by Graham Steele in 1881, and elaborately presented for our recognition by Bryant in *Guy's Hospital Reports*, vol. lv. p. 81, is the subject of a lecture by H. Batty Shaw,[1] who is also a believer in its prevalence. It might be expected to occur with great frequency in cases of mitral stenosis, and, according to the latter author, it does occur in them, but is apt to be overlooked, or if recognized, to be mistaken for an aortic regurgitant murmur. This, we all know, possesses the same area of audibility to the left of the sternum; while there are no known physical signs or symptoms special to pulmonary regurgitation. He thinks that many a case has been diagnosed as one of aortic regurgitation with a secondary Flint's murmur at the apex, when the condition was really mitral stenosis with secondary leakage at the pulmonary valve. Again, the same murmur has been sometimes mistaken for a pericardial friction sound, particularly when noticed at the xiphosternum. We must accept this recommendation to interpret it correctly when it comes before us; unfortunately, he does not provide any means of identification, except the changeable and inconstant character of the murmur, and the fact that it is more audible in the erect than in the recumbent posture, often disappearing in the latter. It is strange that with so much obviousness of probability in favor of a functional pulmonary valve leakage in mitral stenosis, so little testimony in its support should hitherto have been received from clinical or pathological observation. The subject is of sufficient importance to call for systematic investigation.

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[1] Munch. med. Woch., Bd. li., No. 22.

[2] Sem. méd., April 26, 1905.

[3] Medical News, May, 1904.

[4] Lancet, November 26, 1904.

"SOFT VALVE" MITRAL STENOSIS. Attention has been called by myself[2] to this not infrequent variety of the lesion in connection with a fatal case of loss of compensation in a woman, aged forty-three years, in whom the existence of stenosis was not suspected, owing to the complete absence of murmurs during a period of observation of eight weeks.

As regards the mode of production of the murmur of mitral stenosis, the case and specimen lent support to the view which is largely entertained, that the bruit is connected with the resistance offered by thickened and rough chordæ tendinæ to the direct current from the auricle, the valve having been found free, not only from marked induration, but particularly from any implication of the chordæ tendinæ and of the musculi papillares; the result being a nearer approach to the "button-hole" type than to the "funnel."

Tumors of the Left Auricle Simulating Mitral Stenosis are, in spite of their rarity, of some distant interest to the practical physician, as this condition might be less impossible to treat surgically than the valvular stenosis for which they are generally mistaken. Quite apart from any future diagnostic possibilities which might lead up to attempts at mechanical treatment, the two cases reported in vol. xxxvii. of the *Clinical Society's Transactions,* by H. T. Thompson and C. U. Aitchison, present aspects of considerable importance. In both of them there existed well-marked signs of obstruction to the passage of blood through the mitral valve, together with embolism in one case of the dorsalis pedis artery, and in the other of the left side of the brain.

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[1] Clinical Journal, July 24, 1904.

[2] Clinical Society Transactions, February 10, 1905; Lancet, and British Medical Journal.

In the first case a well-marked presystolic murmur was heard in the earlier stages, but when the heart's failure became pronounced, it disappeared and gave place to a systolic apex murmur. In the second case a presystolic murmur was present till the end. In both all the cavities of the heart were dilated, and the valves were healthy, with the exception of the mitral valve in the first case. The tumors were regarded as myxomatous polypi.

"New Methods of Studying Affections of the Heart." The method to be described must appeal to the physiologist no less than to the clinical physician, as it is a means of investigating the normal phenomena, as well as their pathological variations in the human subject. It is essentially a comparative sphygmography, in which the heart's action is registered from its left ventricular side—viz., by means of the familiar apex tracing or radial tracing—and also from its auricular side; and herein lies the novelty. In favorable subjects and circumstances a tracing can be taken of the jugular pulse, which contains data capable of interpretation with the help of the simultaneous sphygmogram. The latter enables the carotid beat to be identified in the jugular curve, and this curve then becomes a record of the ventricular as well as of the auricular contractions.

THE FUNCTIONS OF CONDUCTIVITY for systolic stimuli, which is the special object of Mackenzie's[1] present study, is one of the four great functions attributed by Gaskell and by Engelmann and Hoffman, the founders of the "myogenic theory," to the heart fibre itself, apart from any interference by nerves. For, according to this theory, the heart possesses no motor nerves, the vagus and sympathetic nerves having only a moderating influence upon these varied functions of the heart muscle fibres. These primary functions of the myocardial fibre, upon which rests the cardiac automatism, are, in addition to *tonicity*:

1. The rhythmic production of stimuli.
2. The rhythmic excitability by these stimuli.
3. The rhythmic conductivity for these stimuli.
4. The rhythmic contractibility in response to them.

All these being rhythmic, it occurred to Wenckebach that four different forms of arhythmia might be occasioned according as one or the other of them chanced to be depressed, and he based his views upon Engelmann's experiments on the frog's heart. Mackenzie has been able to supply these views with their clinical demonstration.

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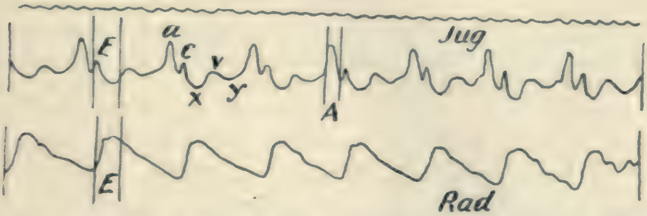
[1] British Medical Journal, March 11, 1905.

It is essential to mention that the muscle fibres of the mouth of the great veins and adjoining remains of the sinus venosus possess the greatest power of automatically creating the wave of contraction, which then passes in a peristaltic manner over the rest of the heart "with varying speed—more slowly over those parts which retain a more embryonic character—namely, the auriculoventricular muscular ring and the bulbus arteriosus."

And it must also be mentioned that the muscular tissue joining the auricle and ventricle (canalis auricularis), while belonging to a less developed type and being less striated, so that the wave of conductivity passes more slowly over its fibres, possesses, nevertheless, a greater power of automatically creating a stimulus for contraction.

FIG. 4



The space E represents the time of the ventricular systole. The wave *a* is due to the right auricle, and the wave *c* to the carotid impact. The space A represents the *a–c* interval. The time marked in all these tracings equals one-fifth of a second.

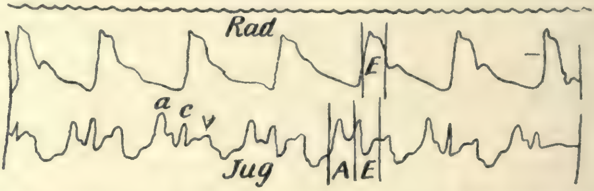
The Method of Estimating the Conductivity over "Gaskell's Bridge," that is, from the auricle to the ventricle, consists in timing the interval between the auricular systole (*a*) and the ventricular (*c*). This *a–c* interval or intersystolic period has a normal duration of one-fifth of a second or rather less. It includes (1) the systole of the auricle and (2) the interval during which the ventricular pressure is rising before opening the semilunar valves (*anspannungszeit* or presphygmic interval). As (1) and (2) are practically constant, they may for the purpose of this inquiry be ignored, any variation in the length of the *a–c* interval being due to variation of the rate of stimulus conduction.

To obtain a tracing of the jugular pulse, a shallow, open cup is placed over the lower end of the relaxed sternomastoid muscle. This cup (or receiver) is connected by means of a tube with a tambour, which is fitted on a Dudgeon or von Jacquet sphygmograph in such a manner that the lever of the tambour can be made to write on the same paper and at the same time as the sphygmograph lever ascribes the movements of the radial pulse.

That a Depression of Conductivity may occur without any Arhythmia is well shown in two tracings (dated 1892 and 1904) from the same patient, in whom the radial pulse was quite regular, but the *a–c* interval lasted two-fifths of a second, showing a relative depression of the function.

Each cardiac contraction means a momentary abolition of all the rhythmic functions, and their subsequent recovery during diastole should be normally simultaneous for all. Delayed recovery means depression, which is often dependent upon a previous exhaustion, and relative rest, as from lessened frequency of beat, may then restore the conductivity to its previous rapidity.

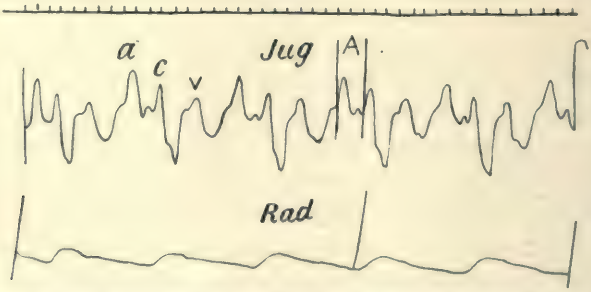
Fig. 5



The *a–c* interval (space A) is twice the normal period, lasting two-fifths of a second in place of one-fifth, as in Fig. 4, indicating a delay in the stimulus passing from auricle to ventricle (taken in 1904).

When a stimulus arises prematurely in the auricle, the conductivity has not yet been completely restored, therefore, the stimulus takes a longer time in passing to the ventricle, and as a consequence there is an increase of the *a–c* interval.

Fig. 6

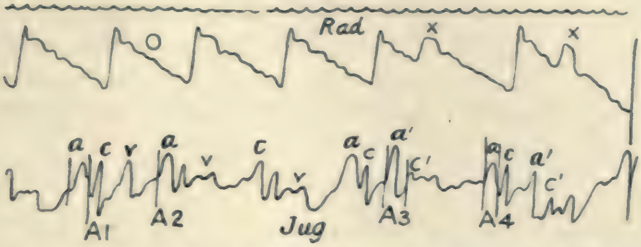


The *a–c* interval (space A) equals two-fifths of a second. (Taken in 1892 from the same patient as gave Fig. 5.)

Arhythmia arises when the conductivity is so grievously depressed that the stimulus occasionally or frequently fails to cross the auriculoventricular junction. Manifestly the auricular systole *a′* (in Fig. 7) occurred so soon after the previous ventricular systole (as evidenced by the carotid wave *c* immediately before *a′*) that there was not sufficient time for the recovery of the function of stimulus conduction in these fibres; and hence no stimulus reached the ventricle and a beat dropped out. By this means a longer rest is procured for these fibres, and when the next stimulus comes down from the auricle the *a–c* interval following the pause is shorter than the average.

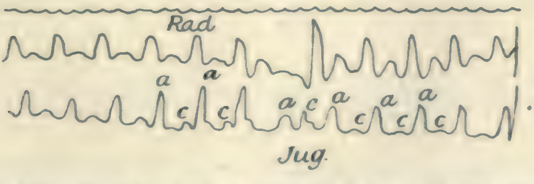
Bradycardia is Due to Depression of Conductivity. Gaskell states that on applying a screw clamp around the auriculoventricular groove of a frog's heart, "according to the tightness of the clamp the ventricle can be made to beat synchronously with the auricles, to respond to every second contraction of the auricle, to respond to every third, fourth, or other contraction, or to remain quiescent." All these varying results can be demonstrated to occur in the human heart.

FIG. 7



Shows two premature or extra systoles of auricular origin (x). The waves *c'* in the jugular tracing occur at the same time as the small premature beats (x) in the radial tracing, and are therefore due to the carotid. These are preceded by premature waves *a'* due to the auricle. The interval *a'–c'* (space A_3) is greater than the average *a–c* interval (A_2), and is much greater than the following *a–c* interval (A_4).

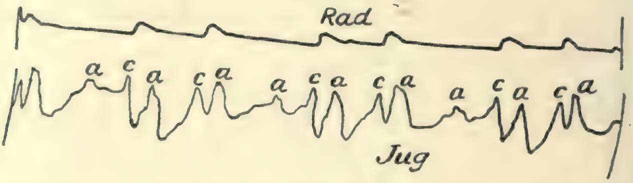
FIG. 8



Shows a gradual lengthening of the *a–c* interval till a radial and carotid pulse beat drops out after the auricular wave *a'*. The following *a–c* interval is shortened.

Independent Ventricular Rhythm Due to Heart-block. When a ligature is applied in the auriculoventricular groove of the frog's heart, so that the stimulus can no longer be conveyed from auricle to ventricle, after a time the ventricle will beat with a rhythm different from and independent of that of the auricle (heart-block). This independent rhythm can be demonstrated as the cause of certain forms of bradycardia in the human subject. On careful analysis of Fig. 11, it is found that the two auricular periods are less than one ventricular period, so that the relationship of the auricular systole to the ventricular systole is a constantly varying one, sometimes at a distance, then gradually approaching till they are synchronous. Whatever relationship the *a* has to the *c*, no variation takes place in the rate. It is remarkable that the pulse rate was almost invariably 30 to 32 beats per minute, whether working or lying in bed. Even when undergoing a surgical operation, observations before, during, and after the administration of chloroform showed the same uniform pulse rate. Prof. Wenckebach noted in a similar case that a glass of port wine considerably quickened the rate of the auricular contractions, while the ventricular rate was unaffected.

FIG. 9



Shows the venous pulse during the arrhythmia. The wave *a* is quite regular in its appearance.

FIG. 10

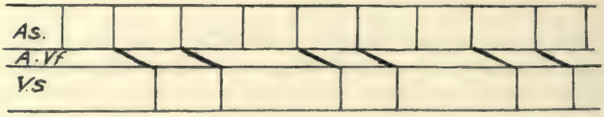
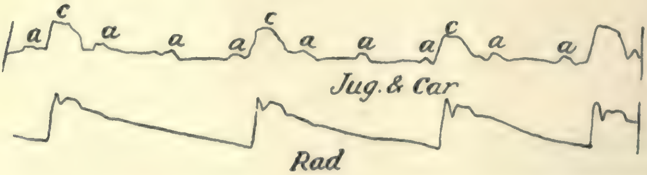


Diagram constructed to show that the arhythmia is due to a blocking of the conductivity at the fibres joining auricle and ventricle (A–V*f*).

FIG. 11

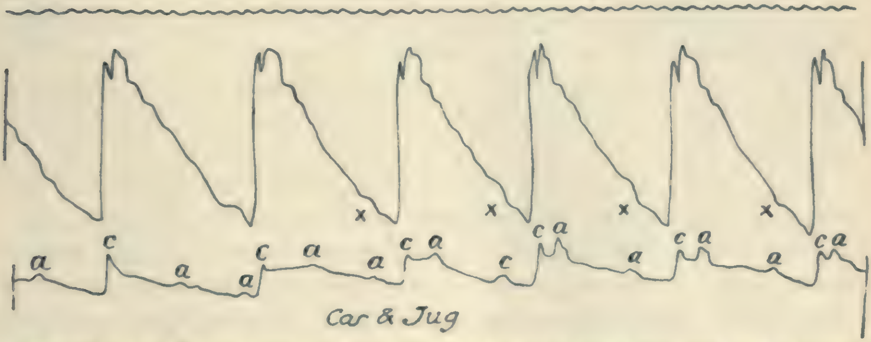


Shows a more extreme form of bradycardia, where the ventricle responds to every third auricular systole. The large wave (c) is due to the carotid. In the last period there are but two auricular waves and the *a–c* interval is longer than after the period with three auricular waves.

It will be obvious from this account, which has been given as briefly as possible, with due regard to clearness, that the method is a new departure in clinical observation, a first step in the analysis of the separate factors in the heart's mechanism, and, therefore, the nearest approach hitherto made to a discriminating use of the various heart remedies, which probably differ in their respective influence upon the several functions, but have hitherto been roughly grouped together as "heart tonics," and as such applied in a chance way without any knowledge of their individual suitability to the special requirements of each case.

THE ACTION OF DIGITALIS ON THE HUMAN HEART. Mackenzie[1] points out that it has been overlooked that digitalis has a peculiar tendency to affect primarily those functions of the heart-muscle fibre that have been previously damaged, the result being the production of an arhythmia due to further depression of those functions. For instance, in hearts where the function of conductivity is normal, digitalis has no effect upon this function, though it may materially affect other functions of the heart muscle. But in cases where conductivity could be shown to be depressed, digitalis very speedily exaggerated this depression, and produced the characteristic dropping out of ventricular systoles.

FIG. 12



Shows in the tracing from the neck that the auricle *a* beats regularly and at more than twice the ventricular rate. The varying length of the *a–c* intervals showed that the ventricle pursued a rhythm of its own independent of the auricle. Note the small dips (x) in the radial tracing, due to the movement of the left auricle affecting the arterial column.

With reference to the conflicting opinions held as to the relative value of various preparations of digitalis, their prescribers may have attributed the very striking results observed to the nature of the drug rather than to the susceptibility of the organ.

Mackenzie believes that the drug affects all non-striped muscle fibre, and that therefore before it can have any appreciable effect upon the heart it may have grievously affected other muscular organs. For instance, the "gastric irritation," so frequently produced by digitalis is really due to the action of the drug in the musculature of the digestive tract.

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[1] British Medical Journal, March 18, 1905.

The irregularity of the pulse so often observed after digitalis is attributed by Mackenzie to its "dromotropic" effect, that is, to its effect upon the function of stimulus conduction (Engelmann). This view is illustrated by a diagram and by simultaneous tracings from the radial artery and the jugular in patients presenting this symptom.

In a further contribution Mackenzie[1] endeavors to show that while in given states digitalis may not depress conductivity, it may take effect either upon the function of stimulus production (the "inotropic function" of Engelmann), or upon the function of excitability, or "bathmotropic function," if either of these should have become, owing to previous damage or depression, unduly sensitive to the drug. Cases such as these display the typical "*pulsus alternans* of digitalis," which in the regularity of its pulse periods (well shown in the Mackenzie tracings) contrasts with the double beat due to "extra systole."

In a fourth communication,[2] the *action of digitalis* is studied in cases where the rhythm of the heart is not governed by the auricle, but by the ventricle.

Lastly, under the heading of "The Inception of the Rhythm of the Heart by the Ventricle," J. Mackenzie[3] puts forward the view that nearly one-third of the cases of serious heart failure owe their suffering to this cause, including those diagnosed as chronic myocarditis, fatty degeneration, dilated heart, paroxysmal tachycardia, delirium cordis, chronic bronchitis with irregular heart, and others. He describes with what rapidity this leads to marked changes in the circulatory system and how rapid too are the patient's improvement, and the disappearance of the signs of heart failure as soon as the heart has reverted to its normal rhythm. This interpretation of the etiology of cardiac failure will probably not be accepted by clinicians without some hesitation. But he adduces arguments which support the causation of the "ventricular" rhythm by an overexcitability of the *a–v* fibres which join auricle and ventricle. These fibres, except in predisposed cases, are the most resistant of all to the influence of digitalis, and may, in spite of its administration, continue to "fire off" an extra systole from time to time.

THE CLINICAL STUDY OF "BIGEMINATE HEART RHYTHM," contributed by C. J. Fauconnet,[4] is of special interest in connection with the theory of "heart-block" recently brought into prominence by Wenckebach and by J. Mackenzie. On the strength of Salaghi's experimental work, showing that a persistence of this rhythm must add to any engorgement of the lung due to mitral defect, he regards pulsus bigeminus as an imperative warning to withhold digitalis. His explanation attributes to the latter the causation of maximal ventricular systoles with wasteful but ineffectual extra systoles.

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[1] British Medical Journal, April 1, 1905.

[2] Ibid., April 8, 1905, p. 759; ibid., April, 1905.

[3] Ibid., April 15, 1905.

[4] Münch. med. Woch., December 20, 1904.

The frequency of cases of double heart beat is well known, and is illustrated by the numbers quoted by the author. This is doubtless due to the great prevalence of treatment by digitalis. But it also occurs quite independently, as in three instances which he mentions. This suggests some definite cardiac condition, such as "heart-block," which is apt to arise from varied influences.

CHRONIC CYANOSIS WITH POLYCYTHÆMIA AND ENLARGED SPLEEN. In connection with his patient, a woman, aged sixty-two years, whose case was peculiar in her having presented the condition all her life, and in association with otherwise similar cases reported by Vaquez, Cabot, McKeen, Saundby and Russell, Osler, Parkes Weber and Watson, R. M. Ronaldson[1] throws out the suggestion that the cyanosis is secondary to the polycythæmia and that the unexplained excessive production of red cells is probably compensatory, being required to fulfil some still unknown function other than mere oxygen carrying.

Assuming Malassez's view and that of Gibson to be correct, which assumes a normal retardation of the red cell in the capillaries, the delay in this affection would be for obvious reasons greatly increased, owing to greater viscidity and the red cells more completely deprived of their oxygen.

Endocarditis. CARDIAC SYMPTOMS INCIDENTAL TO MALARIA are described by P. Gallenga[2] in connection with three typical cases. They closely resemble those of acute infectious endocarditis or myocarditis, suggesting that the malarial infection, though as in these cases it may be mild, may in certain individuals exercise a specific action upon the myocardium. The symptoms in question—viz., ventricular dilatation with threatened failure and functional mitral incompetence—call for heart tonics as well as for quinine, and Gallenga recommends that the daily dose of the latter should not exceed 2 to 3 grams (30 to 45 grains).

Malarial Cardiovascular Affections. This large and important subject was discussed at the last Panhellenic Medical Congress at Athens.[3] Among 12,000 malarial patients observed by Triantaphyllides, of Batoum, 67 cardiopathies were traceable to the infection, viz., 30 cases of endocarditis (including 3 of pericarditis and about 23 mitral complications), 26 cases of myocarditis, 16 cases of ulcerative endocarditis, 1 case of pericarditis, and 1 case of aortitis. Manoussos regards the cardiac hypertrophy as secondary to the enlargement of other viscera. Kanellis is a believer in an aortitis and an arteriosclerosis of infective origin.

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[1] Edinburgh Medical Journal, September, 1904.

[2] Gazz. degli Osp., xxv., p. 139.

[3] Grèce med. militaire, 1904, v., Nos. 11 and 12.

Pseudomalarial Types of Infective Endocarditis have been studied by Warren Coleman in a paper in the *American Journal of the Medical Sciences* for March, 1905, to which the reader is referred.

Tuberculosis of the Endocardium and of the Aorta, found in advanced cases of the disease by various observers anterior to its experimental production in animals by Michaelis and S. Blum, has been studied by means of intracardiac injections of Koch's bacillary emulsion by Léon Bernard and M. Salomon,[1] instead of by intravenous injections. They claim that the resulting endocarditis may be regarded as analogous to the "primary tubercular endocarditis" first described by Jousset and Braillon, and is capable of being set up by injections into the ventricle, in the absence of any pre-existing endocarditis. Both in the endocardium and in the aorta the granulations are fibrinous and apparently identical (but for their bacillary contents) with those of common endocarditis, although typical nodules are to be found in the other tissues in the same hearts.

LARGE TUBERCULOUS NODES OF THE RIGHT AURICLE were found by Raviart and Caudron[2] after death from acute pneumonia in a man, presenting caseous bronchial glands and a small tubercle of the brain. The two firm nodes had perforated the endocardium, but not the pericardium. The cases agree with most others in the implication of the right auricle.

A Hemorrhagic Form of Tuberculosis of the heart is described by Guido Sotti.[3] His two cases show that this may show itself by isolated foci or by a disseminated tuberculosis of the whole heart.

TREATMENT OF INFECTIVE ENDOCARDITIS is still owned to be beyond our control, judging from the conclusions of Robert B. Preble and of Montgomery H. Sicard.[4] The latter finds treatment unavailing, except sometimes serotherapy. Preble, who limits himself to the subject of *pneumococcus endocarditis*, recommends rest and supporting measures. He regards this variety as representing 25 per cent. of all bacterial cases, and complicating attacks of pneumonia in the proportion of 1 per cent. of all cases and of 5 per cent. of the bad cases. It affects the valves of the right heart less often than of the left, but about four times more frequently than in any other form, and most often the aortic valves. Meningitis is a complication in 60 per cent. Leukocytosis is frequently absent and blood cultures are not always successful.

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[1] Revue de médecine.

[2] Echo Med. du Nord., November 6, 1904.

[3] Giornale della R. Acad. di Med. di Torino, February and March, 1904.

[4] American Journal of the Medical Sciences, November 1904.

Sicard believes in the existence of rare cases of primary infective endocarditis. But it is usually secondary to rheumatism, to septicæmia, to the acute infectious diseases, or to an old endocarditis. Cases due to severe infection may survive a few days; the septic ones a few weeks. In the first variety the leukocytosis may reach 15,000 or more; in the latter it may be very slight.

A. R. Spencer,[1] in reporting the successful employment of *antistreptococcus serum* in a severe post-scarlatinal endopericarditis in a boy, aged five years, arrives at the following practical conclusions, also based upon the literature of the serum treatment: 1. The earlier the treatment is begun the better the hope of recovery. 2. It is undesirable to wait for ominous confirmations of the diagnosis, such as embolism. 3. The size of the dose should be regulated, not by the age of the patient, but by the gravity of his condition. With these views we most entirely concur, the only question being the efficacy of the individual serum.

Myocarditis. It is in the nature of things that myocarditis, with its scanty array of symptoms and absence of any truly distinctive sign, should occupy a position in our nosology the limits of which are ill-defined and may call for a searching survey. Any analytical work, such as that of Henry Jackson,[2] who describes seven varieties, or of John W. Bell,[3] who discusses the practical clinical aspects, including those of diagnosis, are welcome helps. But there is need for some comprehensive discussion and some authoritative pronouncement to establish that greater accuracy in terms which is the necessary basis for greater precision in thought, observation, and report.

We cannot quarrel with an expression such as "syphilitic myocarditis," applied to a case of a gummatous deposit in the heart wall, any more than with "syphilitic myositis" in a case of gummatous node in any muscle. Yet it would be better to connote, by using the strictly correct term, that there was not any myositis nor any myocarditis, though there existed a syphiloma in the situations described. In fact, much of that which is commonly termed myocarditis is of the nature of neoplasm, and another great batch is purely non-inflammatory degeneration. There remains a limited group in which true inflammation, localized or general, can be traced in the myocardium after death more often than during life. George Carpenter,[4] who had previously reported in *Pediatrics*, vol. ii. pp. 234 to 238, two fatal cases of heart disease in which the cardiac muscle was alone involved, claims to have diagnosed the condition during life in a child, aged seven years, and verified the diagnosis after death.

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[1] Lancet, February 18, 1905.

[2] Boston Medical and Surgical Journal, September 29, 1904.

[3] New York and Philadelphia Medical Journal, May 14, 1904.

[4] Lancet, October 1, 1904.

To an analogous class, but not unexplained, belong the instances of acute myocardial heart failures in children observed by Forchheimer[1] after scarlet fever, diphtheria, typhoid fever, pneumonia, acute rheumatism, and septicæmia. The treatment includes absolute rest as the first essential, judicious stimulation, and if vasomotor paralysis should call for it, the hypodermic use of adrenalin.

ACUTE "DIPHTHERITIC" HEART FAILURE is attributed by Charles Bolton[2] to acute degeneration of the motor nucleus of the vagus, combined with extensive fatty degeneration of the myocardium. He believes this explains all the events, including vomiting and irregularity of rhythm. Recovery may leave, as stated also by White and Smith, a lasting latent weakness of the heart.

The Cardiac Complications of Diphtheria have been made the subject of a special study by F. W. White and H. H. Smith,[3] in a series of 1000 cases of the infection, the majority of which occurred in children. This has been considered by Dr. Preble in PROGRESSIVE MEDICINE, March, 1905, p. 142.

THE ETIOLOGY OF MYOCARDIAL INSUFFICIENCY is discussed by J. H. Pratt[4] in the light of the recent Leipzig teaching, viz., that (1) the alleged fatty metamorphosis (Quain, Rokitansky, Virchow) is merely an intracellular infiltration; (2) the cardiac muscle is therefore not hopelessly inefficient; and (3) that the symptoms of insufficiency are really those of the coexisting coronary sclerosis, with or without fibrosis. The practical bearing of this distinction would be still more important if arteriosclerosis were not in itself so intractable.

THE TREATMENT OF CHRONIC MYOCARDIAL DISEASE, with special reference to the recognition of the fatty and of the fibroid type, is detailed by A. A. Stevens.[5] He resorts to drugs, as does Forchheimer, in the treatment of the acute affections. So long as they are used with safety, it would seem but reasonable not to neglect any help they may offer.

THE TREATMENT OF HEART FAILURE IN PNEUMONIA AND IN DIPHTHERIA. The spirit of S. Solis Cohen's study in prevention and treatment, is A. Jacobi's[6] utterance, which he quotes: "The time to treat heart failure is before it happens." This is also true in diphtheria, where, according to Charles Bolton,[7] primary failure is the immediate cause of death when it occurs in the acute toxæmia. Nevertheless, we must not relax our endeavors to revive the failing organ, hoping always that the weakness may be rather an idiosyncrasy under temporary stress than the result of unsurvivable destruction.

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[1] Archives of Pediatrics, 1904.

[2] Lancet, February 4, 1905.

[3] Boston Medical and Surgical Journal, October 20, 1904.

[4] Johns Hopkins Hospital Bulletin, October, 1904.

[5] American Medicine, August 6, 1904.

[6] Journal of the American Medical Association, December 10, 1904.

[7] Lancet, February 4, 1905.

THE CASE FOR AND AGAINST ATHLETICS is reduced to terms of simple common sense by Robert E. Coughlin.[1] All depends upon the proportion and fitness of things. Athletics and "muscle building" are sometimes pushed to relative excess in those bearing definite delicacy of the cardiovascular or of the nervous system. In themselves they cannot remodel a constitution. But it is obvious that the attendant hygienic circumstances of regular sleep and digestion, increased ventilation, circulation, secretion, and excretion, and metabolism generally, together with almost absolute rest for the psychomental spheres must make for improved strength of the framework and of the mechanisms, if only they are of the wear-resisting material. It is part of the function of a muscle to live up and "live down" to its work. One cannot, therefore, share any misgivings lest hypertrophy of muscle should in itself predispose to degeneracy. Cardiac hypertrophy based upon progressive valvular lesion or toxæmia is totally distinct from that under consideration.

Physical Signs and Physical Methods of Examination. The physical examination of the heart by the ordinary procedure owes much to radioscopy, which has justified the claim of the experts that percussion is competent to furnish an accurate outline. It has, moreover, supplied us with a sure criterion of the results and of the relative value of the various methods. Recognition has thus been secured for the indispensable requirement of a total cardiac outline. Any technique which can only provide the tracing of the absolute dulness, or representations of the organ lacking the faintest resemblance to its contour in health or in disease, is henceforth shown to be hopelessly inadequate and misleading. Three elementary principles are now being voiced by authorities such as de la Camp[2] and Goldscheider.[3]

The discussion as to the relative efficiency of different styles of percussion, and particularly of "superficial *versus* deep percussion," so long inconclusive on the insecure footing of individual opinion, is likely to end of itself. Sir W. T. Gairdner[4] has renewed, after upward of twenty years, his advocacy of the light stroke. The fact is that only a sufficient delicacy of manipulation can yield the tracings which are verified by the *x*-ray, and that the heavy stroke entirely fails to localize the remote boundaries which it is supposed to sound in the depth.

The sectional delimitation of the various heart cavities is beyond the present scope of our manual methods. Here again, radioscopy has saved us from erroneous conclusions; for it has shown the futility of the Marburg contentions that the phonendoscope and auscultatory friction can discriminate between ventricle, auricle, and septum. On the other hand, it has itself made some progress in that direction. Not only does it reveal cardiac variation in general outline and position special to partial and to deep inspiration and expiration,[1] but, according to Kraus,[2] it reflects in the "moulding of the contour" some of the morbid departures from the normal outline, such as, for instance, the extension of the right upper border in aortic and mitral defects, the increased convexity of the so-called "left middle arc" in mitral insufficiency, and the marked contrast in the degree and prominence of the "left lower arc" in mitral stenosis and insufficiency respectively. Inasmuch as the auricular and the ventricular systole can be clearly distinguished, it thus becomes possible to verify the correctness of Mackenzie's sphygmographic method; for after artificial inflation of the stomach independent auricular contraction may sometimes be identified in the proportion of 2 or 3 to 1 ventricular systole.

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[1] Medical Record, September 24, 1904.

[2] Berliner klin. Woch., February 13, 1905.

[3] Ver. f. inn. Med., Berlin, January 2, 1905; Sem. méd., January 11, 1905.

[4] Edinburgh Medical Journal, November, 1904; New York and Philadelphia Medical Journal, December 17, 1904.

INSPECTION. *Broadbent's Sign.* It is well known that systolic retraction of the left eleventh and twelfth ribs and of their interspaces has long ceased to be claimed by Broadbent as a trustworthy sign of intrapericardial adhesions of the heart. A. W. Tallant[3] draws our attention to the fact that, in their absence, it is often perceptible in thin subjects, apparently from cardiac hypertrophy, and suggests that this may be due to the pull upon the normal attachments of the pericardial sac to the diaphragm. It seems necessary to make a distinction between the retraction of the interspace and that of the ribs themselves. As regards the former, I believe that it may sometimes be transmitted from the heart through an imperfectly expanded and partly compressed lung. Marked systolic retraction of the twelfth rib is, in my opinion, often due to adhesions of the diaphragm to the base of the lung, or in the pleural sinus, thus shortening and tightening the muscular fibre. Mere cardiac enlargement by depressing the diaphragm somewhat slacks its pull, though it would render it more direct. We are still very uncertain as to this sign.

PALPATION OF THE HEART has been practised by Bassi[4] in heart disease as a useful confirmation of the data of percussion, particularly in children. But his estimate of its capabilities is not so high as that entertained by Robert Maguire, who, some years ago, thought that it was possible to palpate the outline of the whole heart with accuracy, even in the adult. I doubt whether palpation can improve upon the work of light finger percussion, though an indispensable adjunct to it.

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[1] Goldscheider, loc. cit.

[2] Deutsche med. Woch., January 19, 1905.

[3] Boston Medical and Surgical Journal, October 27, 1904.

[4] Gazz. degli Osp., 1904, No. 58.

Auscultation. *The Diagnostic Value of Dorsal Auscultation* is well brought out by W. Libensky's[1] observations in 22 cases of aortic valvular incompetence and numerous mitral cases. In the latter the distinctive locality for the bruit is the lower angle of the left scapula; in the former the left supraspinous fossa, and the three upper dorsal spines, though the aortic murmur is often not audible in the slighter cases. These statements are in agreement with general experience. There is also much to say for Libensky's view that enlargement of the right ventricle is responsible for the loudness of the bruit heard at the left thoracic base. There can be no doubt that thereby the position of the left ventricle is altered in a backward direction, and, moreover, that its apex may be kept from direct contact with the anterior chest wall. This alone has been long held to explain the conduction of the murmur of mitral regurgitation to the axillary and infrascapular regions, and it may also explain the fact that functional ventricular murmurs are not conducted that way. The question is, however, how far we can trust to the degree of loudness of the dorsal murmur as a safe test for the severity of the lesion? We should remember that the loudest murmurs are not always due to the worst lesions, and that there are other factors besides a relative approximation of the left ventricle to the posterior chest wall which might influence the transmission of the murmur. Nevertheless, Libensky affords us a valuable confirmation of two important facts: (1) that a murmur heard with special and exclusive loudness below the angle of the left scapula is certainly of mitral origin, and (2) that any considerable dilatation of the right side of the heart tends to favor the dorsal localization in question by imparting to the left ventricle a more backward aspect.

Percussion. *The Supine Attitude* of the patient is not always possible; neither is it unanimously thought to be the best for cardiac percussion. In a large proportion of the cases where examination is most needed, the patient cannot recline. M. B. Lœwy[2] gives a special reason for preferring the upright posture of the thorax, "it brings about slight cardiac fatigue, the evidence of which may be of value;" at the same time, he believes that any posture will serve our purpose, provided it is always the same. Most of our clinicians would doubtless stipulate for the more complete information which can only be obtained by varying the patient's position, and that the average position suitable to all cases is one of moderate inclination of the thorax in the dorsal decubitus.

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[1] Wiener klin. Rundschau, 1904, Bd. xviii., No. 50.

[2] Sem. méd., January 18, 1905.

Several Neglected Points in the Cardiac Examination of Children have been investigated by S. McC. Hamill and T. Le Boutillier.[1] 1. *The Position of the Apex Beat,* investigated in 275 infants and children, was found to be up to the sixth year more commonly in the fourth intercostal space and in the midclavicular line, and afterward usually in the fifth space in or just within the midclavicular line.

2. *The Area of Cardiac Dulness* averaged as follows: In children under three years of age: upper border, second rib; right border, midsternum; left border, just within the midclavicular line. From the third to the sixth year: upper border, the upper border of the third rib; right border, midsternum; left border, in or just without the midclavicular line. From the sixth to the twelfth years: upper border, third rib; right border, from the midsternum to the right edge of the sternum; left border, most commonly in the midclavicular line.

3. *The Venous Hum* was listened for in 226 subjects and was heard in a proportion of cases at all ages, usually best over the right jugular, but often, too, over the left, and it was apt to extend to the manubrium. It was not audible (except in 10 cases) in the recumbent attitude. This postural influence and the fact that even in recumbency it may be induced by full extension of the head, seem to be arguments against the reliability of "Eustace Smith's sign" of enlargement of the bronchial glands.

4. *Functional Heart Murmurs* have been wrongly regarded as exceedingly uncommon. They would appear to be somewhat common; but, perhaps, as suggested, rather owing to loss of general nervous and of cardiovascular tone than to anæmia. They were not exclusively, but more frequently heard after the third year, chiefly over the pulmonary site, and next often over the ventricular area, and in almost every instance only in the recumbent position.

The Treatment of Heart Symptoms. ŒDEMA AND DECHLORIDATION. The study of œdema in relation to chloride of sodium and to various lymphagogues is being pursued with eagerness by French pathologists, who expect great results from the researches now in progress. Although it would not be opportune at this stage to devote much space to a review of a question which another twelvemonth will carry much farther, attention should be called to L. Ambard's paper[2], which deals also with the rôle of digitalis and of theobromine in œdemas and retentions. He believes that digitalis has no direct action upon the heart, but an indirect one only through the diuresis which it induces. Theobromine, too, does not act directly, but indirectly upon the kidney. He supposes that they both exert an attraction upon the tissue serum, drawing it into the blood, and thus antagonize certain metabolic, albuminotoxic, non-crystalloid substances, which drive the serum into the tissues and concentrate the blood. These are quasi "secretory" acts and dominate the situation, the saline osmotic events being merely physicochemical, as it were, undercurrents, not vital phenomena.

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[1] Journal of the American Medical Association, January 7, 1905.

[2] Sem. méd., October 5, 1904.

The subject of œdema in its double relation to the circulation and to metabolism and the kidney has been raised to a new level by the pioneer work of George Oliver on tissue lymph (noticed in last year's report) and of Widal and Javal on chloride retention, and Javal[1] has recently contributed a useful article on the "Indications for the Dechloridation Treatment in Œdema."

Elaterium in Non-Purgative Doses. Henry Sewall[2] reports excellent and durable results in a series of 20 cases from doses of $\frac{3}{32}$ of a grain, on two or three successive days, every hour, until nausea is produced. Nausea occurred in about half his cases. Some purgation usually resulted also. He believes in a special power of the drug to promote absorption from the tissue spaces.

DIGITALIS: ITS ADVANTAGES AND RISKS. Owing to the cumulative property of digitalis, its administration in increasing doses is capable of exceedingly varied effects. The therapeutical or "peripheral" effect would be the first to appear; the physiological or "central" toxic effects would follow from a longer continued administration or of larger doses. Just as we have morphinism or cocainism, we may then have digitalism.

The action of digitalis upon the heart and circulation is clearly stated by J. R. Bradford[3] to be superior to that of any of the other allied glucosides, such as those of strophanthus, apocynum, convallaria, etc., and to have held its own since it was first applied (about 1773) for the relief of dropsy. Digitoxin, its most poisonous ingredient, soluble in alcohol and therefore contained in the tincture, takes a marked effect upon the nervous system and the alimentary canal in contrast with digitalin and digitophylin. This must be borne in mind in connection with its extremely cumulative property, and with its special character as an irritant to the mucous membrane.

Upon the central nervous system its poisonous effects are in succession, delirium, collapse of the nervous centres, and lastly arrest of respiration, so that death is not necessarily due to its action upon the heart. Another important effect of fatal doses is suppression of urine. All these results are apt to occur in every-day practice from relative overdoses or cumulation of digitalis, and in a minor degree from strophanthus, apocynum, convallaria, or other allied glucosides also.

As a general protoplasmic poison, digitalis develops its chief power upon muscle of all kinds. In the frog its local application to the heart or to involuntary fibres is capable of arresting their contraction. And in general it acts much more powerfully upon involuntary than upon voluntary fibre, in exact opposition to strophanthus; both of them acting powerfully upon the cardiac fibres.

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[1] International Clinics, vol. iv., fourteenth series, 1904.

[2] Therapeutic Gazette, November, 1904.

[3] Clinical Journal, July 27, 1904.

The three forms of activity of muscle, rapidity of contraction, tonicity of contraction, and rhythm of contraction[1], are differently influenced by digitalis. In the frog its local application so much increases the systolic tonicity that the rhythmic automatic stimulus is overwhelmed and the heart permanently ceases to beat, although still living. The usual form of slowing is worked through the inhibitory mechanism, central and cardiac, which also develop increased power in the contraction. This effect is prevented by a previous administration of atropine. In mammalia the toxic arrest is never systolic, but diastolic, perhaps owing to the much higher development of the inhibitory mechanism which centres in the auricle, whereas the other action, that of increased force, is the direct action of the drug upon the ventricle. The complete emptying of the latter is more favored than that of the auricle, and this is apt to become overdistended as a result of digitalism. A further effect is the dropping of some of the beats, and still more advanced result is the enfeeblement of some of the systoles. A block occurs at the auriculoventricular groove, which the diminished auricular impulses do not transgress and the ventricle takes on its own independent beat. Hence there is increasing irregularity with the progress of digitalization. J. Mackenzie, of Burnley, has directed special attention of late to the clinical occurrence of this perverted gait, or arhythmia of the heart with the ventricular inception of the cardiac rhythm.

The first result of digitalism is thus a bigeminate beat or an alternating strength of beat. More complex groupings and intermissions will next arise until the chaotic action named *delirium cordis* is reached. Though the two ventricles may act with different power, they never beat at different times, but always together; although the impression conveyed in delirium cordis is apt to suggest an opposite conclusion. The muscular stimulation and response are in fact apt to tell unilaterally, but the innervation is affected bilaterally.

Digitalis as Affecting the Vessels. Lasting constriction of the arteries is the most special feature of digitalis, strophanthus having only very slight action upon the arterial fibre, and having, therefore, with certain advantages, the disability of not being able to keep up blood pressure, the failure of which is usually the precursor of death. This constricting effect has been proved by experiment to be a direct local effect. But there is no experimental evidence supporting the statement that the renal arteries are dilated by it. Bradford[1] states that they are constricted like all others, as demonstrated in all of them except the cerebral arteries. Therefore, the diuretic action must be due to the increased blood pressure where it had previously fallen too low, for Bradford reminds us that in health digitalis is not a diuretic. Its service is to restore healthy circulation and normal urinary flow. Its physiological or toxic renal effect is just the opposite, that of diminishing or even suppressing the urine.

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[1] Loc. cit.

Digitalism and Sudden Death. The sudden deaths occurring on sitting up are sometimes ascribed to the digitalis which may have been taken. Bradford, while recognizing the various physical and vasomotor reflex events which accompany the act of sitting up, suggests that those sudden deaths may have resulted from the disease rather than the remedy. Indeed, I would add that the threatened arrest of heart or respiration may sometimes have been the cause of the patient sitting up.

In conclusion, let us look at the heart merely during its systole, but remember the diastole, when the heart is still resisting distention. If it receives too much blood it will fail to expel all of it, and the circulation will be deranged. The virtue of digitalis is apparent in this direction. It keeps up the tonic diastolic ventricular attitude, braces up the ventricular wall against the auricular flood, and thus regulates the systolic charge. I agree with Bradford in regarding the most valuable service of digitalis to be an increased cardiac tone. The next in value would be the constriction of the bloodvessels coincident with the diuretic action, and the least steadying of the rhythm with an increase in the force of the beat. This slowing action is not obtainable in pyrexial tachycardia, nor in tachycardia due to nervous causes, but chiefly in affections of the muscular mechanism of the heart. "Strophanthus has not been so serviceable, and not a great success. It does not raise blood pressure, and without blood pressure there can be no circulation."

MORPHINE has been recommended as a quick substitute for digitalis, the effects of which require two or three days to allay irritability, hurry, pain, and dyspnœa, even in the presence of anginal manifestations. This is much insisted upon by Grassmann,[1] who advocates repeated small doses for the relief of Cheyne-Stokes' symptoms. This beneficial effect of morphine in extreme conditions is worth securing, not using it as a substitute, but to prepare the way for digitalis. Unexplained sudden deaths from moderate injections have been recorded. They are rare, but teach us caution. The acute affections, and those with effusions or pulmonary and renal complications, are less suited for the use of the remedy than subacute and chronic cases with subjective sensations and nervous overstrain or fatigue.

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[1] Münch. med. Woch., 1904, No. 28.

The Treatment of the Cardiac Form of Insomnia, which rouses the patient with heart discomfort after an hour's sleep, chiefly when he has lain on the left side, is the administration of a minute dose of digitalis (0.015 gm.), $\frac{1}{10}$ gr., and of morphine (0.0025 gm.) at bedtime. Feilchenfeld[1] has found this most successful. Other cases are due to intestinal irritation and need two or three small doses of sulphonal (0.25 gm.) during the afternoon.

Nitroglycerin, owing to the fact that degrees of individual susceptibility differ so greatly, is a somewhat awkward remedy. H. P. Loomis[2] dwells upon its limitations, as, for instance, in marked arteriosclerosis. He believes, however, that its failure in suitable conditions has often been due to the inadequacy of the usual dose. He regards $\frac{1}{50}$ of a grain as a minimum for ordinary purposes, and much fuller doses are often indicated.[3]

Suprarenal Extract and Adrenalin. That in the suprarenal substance we possess a most powerful stimulant to the heart and to the muscles is placed beyond all doubt by the careful observations of Beaman Douglass[4] on "The Effects of Suprarenal Preparations on Living Protoplasm." To mention only one of his experiments on the turtle's heart, the result in five minutes after an intraperitoneal injection of 2 c.c. of a 0.001 solution of the alkaloid was to raise the heart rate from 67 beats in five successive minutes to 144 beats, the normal rate not being re-established before three hours. No less striking were the rapid and violent contractions and the extreme tonic spasm respectively excited in Medusæ by moderately strong and by very strong solutions. Douglass sums up his extensive investigation in the conclusion "that suprarenal preparations have a tremendous influence on the power of cell division, on the development of protoplasm, on the movement of cilia, and on contractile tissue."

Influence of Suprarenal Extract upon Absorption and Transudation. Similar views as to the mechanism of this retarding influence are arrived at by S. J. Meltzer and John Auer,[5] as a result of a laborious research. They consider that the extract causes a contraction around the endothelial pores through which they believe that transudation and absorption takes place; in a word, that by an increased tonicity of the endothelial protoplasm a decrease of the vital permeability of the blood and lymphatic capillaries is brought about. It is necessary, however, to add the author's statement that: 1. Intravenous injections of suprarenal extract retard invariably the processes of absorption and transudation. 2. Subcutaneous injections also often show a retardation of these processes; the effect, however, is neither strong nor constant. 3. In frogs the retardation of absorption of some substances was recognizable only when suprarenal extract was previously mixed with that substance, or when both substances were injected into one and the same lymph sac.

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[1] Berliner klin. Woch. 1904, Bd. xli.

[2] Medical Record, New York, March 18, 1905.

[3] Von Noorden.

[4] Journal of the American Medical Sciences, January, 1905.

[5] Ibid., pp. 114–129.

The inferences from clinical observation as to the mode of response of heart and bloodvessels to suprarenal preparations are thus entirely borne out. We possess in them remedial agents of the first order, both as regards power and adaptability.

From his research on suprarenin, Mueller[1] reports among other favorable results, that the solution (which can be sterilized by boiling before injection) stimulates the heart, and that 1 c.c. of the 1:10,000 solution can be injected into the myocardium of animals; 10 c.c. of the 1:1000 solution can be safely injected subcutaneously into the human subject. As this strength absolutely controls parenchymatous hemorrhage, its local use is indicated in operations on the liver or kidney.

Caution in the use of the adrenalin injection is impressed upon us by J. Barr's[2] experience. In a boy with pericardial effusion, after the removal of 20 ounces of serum, an injection of 40 mm. of a 1:1000 solution of adrenalin was made into the pericardial sac. The result was that the pulse disappeared at the wrist, and for a time the boy's life was in imminent danger. "Here the cardiac failure must have been due to contraction of the coronary arteries." Oliver and Schafer had found experimentally that the depressor nerve failed to act when the arteries were contracted by suprarenal extract.

CARDIAC TREATMENT BY HYGIENIC MEASURES is a rapidly expanding subject. Alexander Morison[3] deals happily with the treatment of the muscular, hæmic, and mechanical factors. To C. M. Cooper[4] we owe practical remarks on "Posture in the Treatment of Disease." Again, "cold" locally applied has been held to be of value on the strength of the rapid relief so often observed after the use of the ice-bag; but Krebs[5] has arrived at the conclusion that much of the alleged benefit in cases where cold has been employed systematically has been really due to the rest enforced upon the patient.

HYPERPYREXIA. John Haddon enters a strong plea in favor of *Currie's cold affusion* in hyperpyrexia, a forgotten boon. But Berg[6] deprecates its employment in those special cases which are due to measles or scarlet fever, with checked cutaneous exanthem.

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[1] Münch. med. Woch., Bd. li., Heft 5 and 6.

[2] British Medical Journal, January 14, 1905, p. 56.

[3] Edinburgh Medical Journal, November, 1904.

[4] Journal of the American Medical Association, December 10, 1904.

[5] Berliner klin. Woch., April 25, 1904.

[6] Medical Record, July 2, 1904.

THE ABUSE OF WATER-DRINKING IN DISEASE, deprecated by Morris Manges,[1] has various evil effects, more often in the direction of the heart and circulation than in others, and the physician should think well before prescribing "as much water to drink as you can."

THE "ROSE-ROSEWATER" PLASTER ABDOMINAL BELT used since 1897 by Nathan Rosewater,[2] but more often associated with the name of "Achilles Rose," possesses, according to Rosewater,[3] among its varied capabilities, that of steadying the irregular and labored heart by preventing "an oversupply of blood being constantly pumped into the brain and crowding the lungs." He claims that the same controlling influence is evidenced by the entire disappearance without medication of hypertrophies of the tongue and tonsils, etc. The varied individual tolerance of the skin complicates the question, but Clemm and others in Germany have paid this method the compliment of imitation.

HIGH ALTITUDE is usually contraindicated, but G. Galli[4] reports good results and no drawbacks in 2 cases of irritable heart, 2 cases of aortic insufficiency, and 1 case of Adams-Stokes' affection, all treated at an elevation of 4000 feet.

THE ARTERIES.

The Aorta. AN INTRATHORACIC EQUIVALENT OF THE "PTOSIS OF THE ABDOMINAL AORTA," which has recently been described by Stifler,[5] is probably to be found in certain cases of cardioptosis; and some analogy may also possibly be traced in the future between the two sets of symptoms. Hitherto special attention has not been called to the aortic section in that group of functional disturbances of the vasomotor and secretory regulation, which is referred to by Stifler as "sympathicismus." The "loose" abdominal aorta may be contracted or it may be dilated. To the latter variety belonged a case in which Stifler mentions the coexistence of cardioptosis, as well as of the kidney symptoms which are the usual accompaniment of the aortic displacement and which sometimes simulates those observed in true aneurysm of the aorta.

CHERCHEVSKY'S NORMAL AORTIC PERCUSSION REFLEX[6] (described in the *Semaine médicale*, 1898, pp. 409 and 410) consists in a widening of the area of the aortic dulness as a result of percussing the second right interspace with a hammer, and in a diminution of the same area of dulness when the epigastric fossa is percussed, this had been stated by Cherchevsky to be absent in diseases of the aortic wall, and this absence he had regarded as diagnostic of aortic lesions. But E. Rondot, of Bordeaux, who is careful to exclude the factor of pain by using his fingers instead of a hammer, finds that the reflex may be absent in quite early stages of various types of aortitis, anterior to any structural lesions. Moreover, he has noted the same absence in various kinds of acute cases not suffering from aortitis. This would seem to deprive this sign of much of its alleged significance as a test for aortic trouble.

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[1] New York and Philadelphia Medical Journal, January 21, 1905.

[2] Cleveland Medical Journal, May and June, 1900.

[3] New York and Philadelphia Medical Journal, August 19, 1904.

[4] Rif. Med., xx., 1904, No. 12.

[5] Berliner klin. Woch., 1904, Bd. xli., No. 36.

[6] Sem. méd., December 14, 1904.

IN A CASE OF ACUTE AORTITIS, which lasted in a man, aged forty-five years, only seventeen days, instead of the more usual duration of two to six months, death occurred suddenly; this probably resulted, as thought by Walter Broadbent,[1] from an almost complete occlusion of the coronary orifice by the acute swelling which was grafted upon pre-existing atheroma.

A Case of Acute Postinfluenzal Aortitis in a man, aged twenty-eight years, followed by the slow evolution of atheroma, aortic valvular insufficiency and Bright's disease, is described by M. Breton.[2] The gradual development of the lesions extended over a period of eight years.

The aorta has received an unusually large share of attention from the pathological side, as well as the clinical. Experimental pathology has now demonstrated beyond any doubt the production in rabbits by systematic treatment with adrenalin of aortic lesions analogous to atheroma, a fact laden with weighty inferences.

Our knowledge on the causation of *aortic aneurysm* has also been much advanced by the searching investigations of Chiari and of Benda[3] on *syphilitic mesaortitis,* which they believe leads to the gummatous degeneration and scarring responsible for the loss of parietal support and for the resulting sacculation. Their conclusions help to justify our empirical belief in the value of the treatment of aneurysm by iodides and to explain its varying measure of success.

The Share Taken by the Elastic Tissue of the Aorta in the Pathological Processes has been variously discussed. Fritz Schwitzer[4] considers it to be a leading one, as he believes the chief function of the elastic coat is that of "inhibiting overexpansion." Its lesions, if carefully analyzed, furnish us with a clear distinction between senile changes, syphilitic aortitis, and true arteriosclerosis.

Arteritis. A third case of obliterative arteritis leading to gangrene of extremities in an otherwise apparently healthy man in the prime of life is added to those previously reported in 1903 by E. Michels[5] and F.

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[1] Lancet, May 27, 1905.

[2] Sem. méd., April 26, 1903.

[3] Verh. d. Deutsch. path. Gesells., 1904, Bd. vi.

[4] New York and Philadelphia Medical Journal, July 9, 1904.

[5] British Medical Journal, September 12, 1903.

Parkes Weber.[1] All three occurred in London East End Jews. I. Israël,[2] of Berlin, has also recently described idiopathic gangrene observed in men of thirty to forty years, especially Russian Jews.

The Influence of Emboli upon the Temperature. The clinical interest of J. Hanatek's[3] experimental production of embolism in dogs by injecting starch, small beads, etc., or by introducing rough wire into the jugular and other veins lies in his conclusion that while irritation of the vein and embolism set up pyrexia, direct irritation of the endocardium by the introduction of a glass rod or otherwise causes a fall of blood pressure and lowering of the temperature. He believes that this may explain why an embolus in the pulmonary artery sometimes does not give rise to any fever; in these cases the occurrence of irritation of the endocardium probably accounts for the apyrexia.

Arteriosclerosis. THE ETIOLOGY OF ARTERIOSCLEROSIS is acquiring ever-growing importance in connection with our endeavors to lengthen the span of life. The analytical method is needed not only, as claimed by T. D. Savill,[4] for a separate investigation of each of the three arterial coats, but in a special degree for a better division of the heterogeneous group into its separate varieties and into its stages. The question as to its pathology has divided the greatest authorities in the past and remains unanswered still. The prevailing view has attributed primary importance to occlusive changes in the nutrient vessels or vasa vasorum (Martins). D. L. Jores,[5] of Bonn, who has made a special histological study of the changes in the internal coat in which he describes three varieties of lesion, a mixed form and two pure forms, the one strictly hyperplastic affecting the composing elements of the intima, the other proliferative affecting chiefly the subendothelial tissue, ascribes the causation to an exaggerated response on the part of the coat to the call for increased resistance to an inordinate blood pressure. T. D. Savill lays great stress upon the part played by the middle coat in the early etiology, owing to that overgrowth of the muscular layer to which he has attached the name of "arterial hypermyotrophy," which may result from chronic renal disease, but has many other causes productive of the high arterial tension. Hence, the importance of a recognition of its potential evils, such as circulatory accidents, nutritional disturbances, disturbance of balance between heart and arteries, and inevitable degenerations, senile decay, and postural vertigo. The combination of arterial hypermyotrophy and focal necrosis of the media may produce death by hemorrhage at a comparatively early age.

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[1] British Medical Journal, April 8, 1905.

[2] Berlin Medical Society, November 9, 1904.

[3] Wiener klin. Rundschau, Bd. xviii., Nos. 50 and 52.

[4] Lancet, September 24, 1904.

[5] Wesen und Entwickelung der Arteriosklerose, etc., Wiesbaden, J. F. Bergmann. (An Anatomical and Experimental Inquiry as to the Nature and Causation of Arteriosclerosis, F. Bauermeister, Glasgow, 1903.)

The external coat has also been credited with some primary causal agency, for Thoma propounded the view that the arteriosclerotic deposit was nothing more than a patching up or plastering up of weak spots, the filling in of the depressions of the intima over small aneurysms or pockets produced by overstrain in the adventitia. The older views were more general in scope and in expression. Virchow and Cohnheim regarded the proliferation as inflammatory in a modified sense. Rokitansky suspected that the deposits might be derived from the blood itself, and Traube that they were the outcome of local settlements of leukocytes.

THE RELATION OF THE ACUTE INFECTIONS TO ARTERIOSCLEROSIS has been studied by William Sydney Thayer and Clinton Ethelbert Brush, Jr.,[1] and supports the view that while typhoid fever must be regarded as a factor in the production of arteriosclerosis, acute arteritis of the medium-sized and smaller vessels is an undoubted result of the infectious diseases. According to them, rheumatism ranks first and typhoid next in the production of "palpable arteries." The authors, while recognizing the predominant causal importance of hypertension, suggest that the special effect of the acute infections may be the production of those focal degenerations with secondary regenerative changes which constitute the other important element in arteriosclerosis. They have done good work in calling attention to the possible analogy between the vascular sequelæ of some general infections and those of syphilis. The latter are believed by C. Travis Drennen[2] to be rather due to the mercury than to the disease; but he gives not the slightest evidence in support of his opinion.

THE ETIOLOGICAL INFLUENCE OF ALCOHOL in the production of arteriosclerosis is studied by Richard C. Cabot,[3] and the share attributable to *lead* by Frank S. Billings,[4] with the thoroughness special to these distinguished authorities.

The predisposing and determining causes of the affection cannot be too often restated. J. M. Anders[5] divides them into five categories: 1. Toxic agencies, such as syphilis, alcohol, and gout. 2. Overeating (excess of carbohydrate and nitrogenous food). 3. Constant hypertension of the arteries produced by muscular overstrain, as in some forms of athletics. 4. Aortic regurgitation. 5. Oncoming senility (senile degeneration). Prophylaxis should be begun in early life, whenever a tendency exists, along the lines which this list suggests.

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[1] Journal of the American Medical Association, September 10, 1904.

[2] Ibid., p. 729.

[3] Journal of the American Medical Association, September 17, 1904.

[4] Ibid.

[5] American Medicine, June 25, 1904.

At the same meeting of the New York Academy of Medicine, Stengel pointed out the necessity of a prolonged convalescence-leave after any of the infectious fevers. Shattuck urged absolute abstinence from alcohol, and Stockton recommended vapor baths twice a week as part of general hygiene, in addition to iodides and small doses of nitroglycerin for long periods.

ADRENALIN ARTERITIS. When allowance is made for the divergence of the individual lines of research, one central fact remains, that of intrinsic hypertension, as the recognized antecedent. According to the latest views set forth by Marchand[1] and by Coplin,[2] the immediate cause of the morbid process is persistent intra-arterial overpressure and its "damaging effect upon the elastic membrane." Arterial thickening and sclerosis are elicited as local measures of protection, but they ultimately lead up to local and general degenerative changes. This theory of the pathology of the affection has received considerable support from the experimental production of lesions closely allied to arteriosclerosis by Josué[3] and by Erb by means of systematic injections of adrenalin. It is conceivable that the adrenals may be primarily concerned in setting up the presclerotic arterial pressure which had hitherto been attributed to toxic influences of a different order. This interpretation is consistent with the fact that abnormalities of the adrenals have been detected by Coplin in a series of cases of arteriosclerosis, and this is, as suggested in an editorial of the *Journal of the American Medical Association* (September 10, 1904), an additional reason for caution in the therapeutic use of adrenal preparations.

It is noteworthy that Josué[4] has satisfied himself by adrenalin intravenous injections in rabbits that the atheroma which results in them is a distinct affection differing from arteriosclerosis. He also found proof of excessive adrenal overaction in three patients who died with marked atheroma.

Attention should be called to the fact that *preliminary thyroidectomy* entirely obviated the atheroma in four rabbits systematically injected with adrenalin by Lortat Jacob and Sabaréanu.[5]

Experimental Arteritis. Rzentkowski[6] finds that some rabbits are more susceptible to adrenalin and die of acute dilatation of the heart and œdema of the lungs in a few days. In some of them localized areas of calcification are found without concomitant small-cell infiltration, which are, therefore, perhaps, not truly atheromatous. Other changes observed are hypertrophy of the heart, cirrhosis of the liver, and renal congestion.

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[1] Munch. med. Woch., 1904, Nos. 17 and 18.

[2] Proceedings of the Pathological Society of Philadelphia, May, 1904.

[3] Presse méd., November 18, 1903

[4] Presse méd., 1904, No. 33.

[5] Sem. méd., November 16, 1904.

[6] Berliner klin. Woch., August 1, 1904.

THE DUCTLESS GLANDS AND ARTERIOSCLEROSIS. The possible relation suggested in this heading is already a question of the day. If we could imagine ourselves to be acquainted only with those agents capable of influencing the state of the blood vessels which are among our most recent revelations, and not to be acquainted with any of the old vasoregulators, we might on this new basis alone evolve a fairly complete theory of hypertension, hypotension, and arteriosclerosis. A theory of this kind is supplied to us by Osborne[1] among advanced suggestions in etiology and in treatment based upon the well-known properties of the thyroid and of the suprarenal secretions. Too much of the one or too little of the other might explain the affection. And there would seem to be but a step to unilateral adrenectomy or ligature of the suprarenal artery as a therapeutical counterpart to thyroidectomy which is already with us; but it is perhaps to be hoped that this development may be reserved for a distant future. Meanwhile, Osborne, who reminds us that the pituitary secretion acts like that of the suprarenal, only less strongly, and that the secretions of the thymus, the testis, and the ovary have vasodilating effects similar to those of the thyroid, discusses seriously the etiological question. For him the essential factor in disturbed tension is a faulty secretion of these glands; for instance, in the senile state of hypertension a relative deficiency of the thyroid and a relative excess of the suprarenal, and these faults can be partly remedied, for thyroid extract may be given or the gland stimulated by small doses of iodide. But we are familiar with causes which we had regarded as in themselves quite sufficient, the "contributory causes" of Osborne, old age, excess of food, of alcohol, of work, etc. These also need attention. Osborne takes a liberal view in his restrictions of alcohol and tobacco; in small doses these are vasorelaxants, but this effect can be secured by very weak doses of nitroglycerin, $\frac{1}{400}$ grain, taken four times daily.

This belief of Osborne in an intervention of the thyroid and of the adrenal secretions as the intrinsic regulators of blood pressure when extrinsic agencies may have been credited with the result, is reflected in James Barr's address on "Arteriosclerosis."[2] Barr considers it probable that arterial hypertension and disease may evolve from adrenal overaction, especially if associated with thyroid inadequacy. But in discussing the interactions of cardiovascular tension and tone, he dwells upon the prominent influence of the quality of the blood. Alkalinity improves the tone; too much carbonic acid raises the tension. George Oliver's investigations on the circulation of tissue lymph have taught us that the purin bodies, whether oxygenous or endogenous, can serve a good purpose in the economy as they raise blood pressure by arteriolar contraction, but they can also wreck the circulation if their elimination should be imperfect.

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[1] New York Medical Journal, August 20, 1904.

[2] British Medical Journal, January 14, 1905.

FOR THE DIFFERENTIAL DIAGNOSIS OF ARTERIOSCLEROSIS, Erlenmeyer makes a good point in the contrast between simple neurasthenia and cerebral arteriosclerosis. He states that while the late symptoms of the latter are focal, the earlier ones are often indistinguishable from neurasthenic symptoms. The effects of temporary exertion, such as any straining, etc., are exactly opposite in the two conditions, intensifying the cerebral symptoms of arteriosclerosis, relieving those of neurasthenia.

THE TREATMENT OF ARTERIOSCLEROSIS. Nauheim baths, suitable only when the blood pressure is not very high, are regarded by Erlenmeyer[1] as the next best treatment after the iodides. He recommends equal parts of sodium and potassium iodide, given well diluted after meals every day, with 8 grains increase every fourth day till 80 grains are taken daily. This should be continued till 300 to 500 grains have been taken and shorter courses of the drug should be repeated every year or oftener. A drachm of sodium bicarbonate with each dose, and the avoidance of acid food are aids against iodism.

The Hypotensive Effect of the Nauheim Bath is greatly intensified, according to the observations of J. A. De Vries Reilingh,[2] by alterations of an interrupted and of a continuous current passed through the bath. It does not appear, however, that the effect is lasting.

The treatment is discussed by J. M. Anders,[3] in its several etiological categories, under the headings of prophylaxis, which should begin in early life on the basis of a perfect nutritive equilibrium and of suitable exercise; of general treatment, with special regard to gout and to alcohol; of hygiene, particularly alimentary hygiene, needing always individual adjustment, and lastly, of medicinal treatment, in which the iodides and the nitrites play a leading part.

Trunecek's Serum has been injected with advantage by De Silvestri[4] in more frequent and larger doses than originally prescribed, namely, daily instead of twice a week, and with progressive increase up to 10 c.c. The invariable effect of the treatment has been to relieve excessive tension and its evil symptoms. No important results can, of course, be expected in the advanced stage of secondary cardiac dilatation.

The Prevention of Apoplexy and of Cerebral Hemorrhage is considered by Clifford Allbutt[5] not to be beyond the scope of practical therapeutics in a proportion of cases, which, of course, do not include those of embolism and thrombosis, or of advanced kidney disease. His hopefulness is based upon a belief that in a large proportion of cases of apoplexy the kidneys are not granular, and that putting aside the more acute local arterial lesions arising from syphilis or leukæmia, the antecedent arterial degeneration is a dynamic result, the accumulated work of a thousand "obscure stresses." Its presence and the implied dangers might in most cases be foretold from the state of the pulse, and if thus recognized sufficiently early, the individual causes which lead up to the vascular degeneration might conceivably be remedied. Foremost among the latter are the excess and complication of our diet, the evil of alcohol, and the excess or deficiency of exercise. Every adult of the age of forty and upward should, according to Allbutt, have his blood pressure measured at regular intervals by means of the best instruments attainable; if persistent rise of arterial pressure is detected, he should revise his mode of life. The wisdom of the aim of this advice cannot be doubted. Neither can it be gainsaid, on the other hand, that the multiplication of the methods of diagnosis and of treatment "by machinery" has its drawbacks. The machine does its work, and its answer is mathematical; but the question was a *vital* one. It thus happens that in spite of its precision the instrumental result is at best an approximation, and that its chief and undoubted value lies in the faithfulness of its record under the more or less artificial conditions of the experiment, and its eliminating the grosser individual errors of observation.

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[1] Deutsche. med. Zeit., Berlin, February 1 and 4, 1904.

[2] Sem. méd., January 11, 1905.

[3] Journal of the American Medical Association, September 17, 1904.

[4] PROGRESSIVE MEDICINE, June, 1904.

[5] Bristol Medical Chirurgical Society Journal, March, 1905.

More questionable is the moral effect upon the patients. Many are apt to trust blindly to any machine-made reply. It is to be feared that if Allbutt's recommendations were to be generally adopted a new nosophobia would arise analogous to that of the unfortunate "brittle" persons in lunatic asylums, and one of a specially pernicious and distracting kind, because the question as to life or death of the patient is exposed to the ever present temptation to consult his pulse. For the present the excellent advice to watch the pulse that we may ward off or delay cerebral catastrophies by sound rules of life should be addressed to the profession rather than to the public. Though earlier recourse should undoubtedly be had to the mechanical pulse gauge, the ominous ghost of arterial degeneracy should be carefully screened off from the scene of action.

The profession, after its efficient subjugation of disease, was in danger of losing its occupation; but Allbutt's invitation to the cultivation of longevity opens up a vast field for its continued activity. Among the illustrative results displayed by W. E. Dixon, of Cambridge, were the remarkable observations of Kocher and Cushing on the enormous increase of pressure set up during compression of the brain, in order to counteract the emptying of the vessels of the medulla by intracranial pressure. The danger of bleeding in apoplexy had thus been made manifest by those observers.

Allbutt's paper has brought up collaterally for renewed discussion a set of awkward questions as to the clinical and pathological etiology of arteriosclerosis and of its results; the renal question between "toxic" and "pressure;" the dietetic question between "overfeeding" and "tissue starvation;" the dynamic question between excess and defect of "tissue activity." The allotment of the share attributable to blood pressure *per se* is complicated by these exceptional instances of arterial degeneracy, which remain free from any high arterial pressure; just as some cases of granular kidney remain free from high arterial tension and from cardiac hypertrophy. These are the cases which may supply the most likely material for a successful study of the problem.

A Search for Checks against the Decay of Age seems to have sprung up under the stimulus of Metchnikoff's sanguine forecast, and of Sir Hermann Weber's practical suggestions for the prolongation of life. Bradford C. Loveland[1] publishes his efforts to limit the progress and the consequences of arterial disease in three of his patients, two of whom suffered in the cerebral; the third in the coronary circulation. All three did well, one of them on pure hygiene, another on cool baths, moderate exercise, regulated diet, strychnine and green iodide of mercury; the third on electricity, a morning draught of sodium phosphate, and three daily doses of well-diluted sodium salicylate and benzoate.

Even mild forms of treatment such as these may not be without their efficacy; but the iodides so long upheld as the *sine qua non* have received additional support from Romberg's[2] observation that iodine renders the blood less viscous, even in relatively small doses, providing there be a due avoidance of acid ingesta. Subcutaneous injections of iodine are a good substitute should the stomach prove intolerant. While strongly to be recommended for the treatment of the arteries, as in early cerebral arteriosclerosis, mild angina, intermittent claudication, etc., iodine is a danger to the cirrhosed kidney, which so often coexists; and in cases of Graves' disease it is also a danger to the heart.

Decalcification of the Arteries sounds plausible as an aim in treatment, yet even in this matter we know too little to pronounce it to be wise. Our chief store of calcium, that of the skeleton, does not need any reduction, and the question will arise whether the physiological or the pathological phosphates would be the first to dissolve away. This uncertainty is one of the reasons why E. Oberndoerffer's[3] demonstration by experiments upon himself of the activity of quinic acid in exporting lime through the intestinal mucous membrane, must remain for the present without its practical application.

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[1] New York Medical Journal, September 10, 1904.

[2] Deutsche med. Woch., 1904, Bd. xxx., No. 48.

[3] Berliner klin. Woch., October 10, 1904.

Angina. The contribution to the subjects of angina pectoris and arteriosclerosis from William Osler's[1] pen affords us the accustomed interest and instruction. *Pain* in arteriosclerosis may be in the head or in the abdomen, and in both regions it is most severe in association with thrombosis. In the extremities there may be simple paræsthesia, numbness, and tingling, or else painful cramp, which may be so severe as to deserve the name "angina cruris;" or again, intermittent claudication, which is usually uncomplicated by pain; or lastly, erythromelalgia.

In the heart the pain is *sui generis* and suggests something distinctive superadded to arteriosclerosis itself. Four groups of cases may be differentiated; 1. The *neurotic angina* of young persons, which rarely may be fatal, and is not due to any coronary or arterial lesion. 2. The *syphilitic angina* of young men incidental to arteritis, coronary or aortic, and sometimes curable by iodide of potassium, though it may develop into aneurysm of the first portion of the arch. 3. The *presenile angina* of the majority of cases, which is part of a widespread arterial degeneration. 4. The *senile angina* occurring after seventy, as a terminal climax of the arteriosclerotic decay.

Cardiac Lesions following Angina Pectoris, including pericarditis, are described by V. M. Kernig.[2] He urges absolute rest for days or even for weeks after an attack, as the best means of obviating a catastrophe.

Bradycardia, its Symptoms and its Treatment are too extensive a subject for discussion in these pages, but they are exhaustively treated by G. A. Gibson.[3] Gillies[4] also deals with the Stokes-Adams' syndrome, for which no satisfactory treatment has yet been discovered; but amyl nitrite, nitroglycerin, and the inhalation of oxygen afford some relief.

The Adams-Stokes Affection will yield up its mystery all the sooner if cases are studied and discussed as thoroughly as that reported by Clarence Quinlin.[5] The condition owes its name and recognition to Adams (1827) and Stokes (in the fifties). Later Cornil (1875) and Handfield-Jones (1876) also reported cases. In 1893 H. Huchard attempted its pathological explanation. In addition to these papers the "affection" is based on a succession of contributions by Balfour (1894), Edgren (1898), His (1899), Hoffmann (1901), Edes (1901), Cassirer (1901), L. Krehl (1901), Luce (1902), Jaquet (1902), Lewy (1902), Osler (1903), and Ortner (1903) is now clearly defined, and is known by the association, in elderly subjects, of bradycardia, which may be only recurrent but usually is permanent, with attacks of unconsciousness and of apoplectic or epileptiform symptoms. The condition has been ascribed by Huchard to the cardiobulbar type of arteriosclerosis. Various circumstances suggest the co-operation of a vasomotor factor, particularly the occasional aura of "blood rushing" to head or limbs, the invariable slowing and sometimes cessation of the heart pulse, the warding off of some of the minor attacks by posture (recumbency or lowering the head), and the provocative influence of emotional stress.

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[1] Journal of the American Medical Association, September 17, 1904.

[2] Roussky Vratch, October 30, 1904.

[3] British Medical Journal, October 8, 1904.

[4] Montreal Medical Journal, June, 1904.

[5] Journal of the Association of Medical Sciences, September, 1904.

If, as held by Belski (1902), the occurrence of "heart-block" at Gaskell's bridge, across which normally motor impulses are conveyed from auricle to ventricle, is evidence of incipient decay of the myocardium, much light is thrown upon associated anomalies, such as that of "auriculoventricular asynchronism," with independent and relatively frequent auricular beats perceptible in the jugular, described by His; and of the "pseudohæmisystole," described by Hoffmann, a form of arhythmia which, by the way, may, according to Dehio, be traced by the action of atropine to either a "mural" or to a "vagus centre" causation, this drug synchronizing the cardiac and radial pulse by suspending the vagus influence.

The policy suggested by this combination of structural degeneration and of functional excitability is "non-interference," except in one direction, that of easing, if possible, the work of the heart by rest and the typically exaggerated arterial pressure by small doses (20 grains daily) of iodide of potassium, by oxygen inhalations (up to 30 litres daily), and avoidance of tea, coffee, tobacco, and digitalis, or any other pressor agent. Together with suitable hygienic and climatic measures, these are the chief indications. In my own experience, passive muscular exercise and massage of the skin and abdomen are essential adjuncts to absolute rest, and much attention should be given to the selection of a suitable diet.

The special service rendered by Quinlin's paper lies in the long-continued observations of the blood pressure in his case. The anomaly that this should be so constantly high (170 to 250 mm.) while the heart is admittedly feeble, and that at the same time the great arteries of the limbs should be elastic, and, moreover, that exercise should invariably raise the blood pressure and rather slow still further the heart rate instead of raising it, tempt him to consider whether those may not be right who like K. Hasebroek,[1] believe in the co-operation with the heart of a secondary peripheral rhythmic motor mechanism for the circulation, that of the vessels and capillaries. These rather advanced speculations might

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[1] Deutsche Arch. f. klin. Med., 1903, Bd. lxxvii.

(it may be suggested with difference) be less needed than it appears if the high-pressure values in question should prove to have been determined exclusively with the Riva-Rocci sphygmometer, an instrument which we should not forget records the maximal pressure of the pulse wave, not the mean pressure within the artery. In bradycardia this wave needs to possess considerable size, as well as pressure, if circulation is to be kept going, in spite of the long intervals between beats.

In conclusion, Quinlin's paper points the way for investigations in one of the most elaborate "set experiments" for research with which clinical pathology has ever presented physiology. The facts displayed in the course of Adams-Stokes' affection, when thoroughly analyzed, will prove to be the key to more than one of the problems of the circulation.

Paroxysmal Tachycardia is best treated, according to James Barr,[1] by rest in bed, the nitrites, counterirritation over the heart, and a dry diet, with suitable purgation. He insists upon the value of deep respirations as promoting freedom of the pulmonary circulation.

Intermittent Claudication or Dysbasia Angiosclerotica was described in 1856 by Charcot, in connection with arteriosclerosis; later cases were published by Leyden (1874) and Erb[2] (1876). Last year[3] the latter contributed 45 additional instances (including typical cases), in some of which the paræsthesia and fatigue of the limb on overexertion did not culminate in absolute loss of power. The typical symptoms are described in the following words by Arthur Patek;[4] "After walking with comparative ease for a few minutes, the patient suddenly experiences a sense of weight and cramp-like pain in the legs; then they give way underneath him, and he falls to the pavement. After a few minutes' rest he recovers, rises, and goes home." Most cases are bilateral, with considerable sclerotic obstruction of all four arteries of the foot; but in some instances the ischæmia is apparently of spastic production (Erb). Most sufferers are men past forty, by nationality Russians or Jews. The influence of tobacco partly explains the difference between the sexes. Charles W. Burr[5] also describes an interesting case of this affection, which, it may be added, seldom attacks the arms.

Blood Pressure in Relation to the Heart. VASCULAR-TONE TEST. *The "Digitocapillary Phenomenon,"* described by M. H. Ferrannini,[6] is utilized by him, in conjunction with the character of the second aortic sound, as a test for the diagnosis of increased or diminished vascular tonus. The method consists in obtaining a plethysmographic tracing of the variations in the size of the distal phalanx as a result of alternately tightening and loosening a tape around the finger, and in noting the presence or the absence of any delay in the alternate production of ischæmia and of hyperæmia. Aortic accentuation coinciding with much delayed ischæmia and hyperæmia indicates the highest degree of vascular hypertony, while a less marked degree of the latter is revealed by a delay in the production of ischæmia only. When the delayed ischæmia is accompanied with abnormal rapidity in the occurrence of hyperæmia, vascular hypotony is present. Undue rapidity of both events, associated with a feeble second sound, corresponds to higher degrees of vascular hypotony. This method has enabled him to demonstrate the unsuspected frequency with which a vasodilatation is combined with arteriosclerosis.

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[1] Lancet, July 16, 1904.

[2] Munch. med. Woch., 1904, vol. li., No. 21.

[3] PROGRESSIVE MEDICINE, September, 1904.

[4] Medical News, December 3, 1904.

[5] American Medicine, September 17, 1904.

[6] Italian Congress, Sem. méd., November 2, 1904.

THE DIAGNOSIS OF ARTERIOSCLEROSIS would be greatly facilitated, according to Lihle's clinical experiments,[1] if arterial blood pressure were always studied not in one, but in two arteries of different degree. Thus he compares the radial and the digital arteries. The normal difference between them should be from 30 to 40 mm. In confirmed arteriosclerotics it ranges from 60 to 120 mm. The very high pressure, even to 150 mm. Hg., is not, as alleged by Z. Basch, distinctive, though it is a preliminary stage in the affection. A practical point of importance is that, although arteriosclerosis in the arms means certainly arteriosclerosis elsewhere, the converse is not true. The reflex neurosis of angina pectoris is a vascular spasm which does not exclusively belong to arteriosclerosis.

THE DIVERSITY OF PRESSURE GAUGES AND GAUGING METHODS render most valuable C. J. Martin's criticism[2] of their technique, and the guiding principles which he lays down with so much clearness. His remarks should be read by all students of blood pressure. From careful experimental determination of the pressure absorbed by the vessel wall itself, he concludes that the external pressure necessary to obliterate an artery is a valid indication of the internal pressure in health within 2 mm., and that in extreme cases of sclerosis about 7 mm. must be deducted from the observed external pressure.

He has tested two distinct groups of instruments: (*a*) those in which the pressure is applied only over a superficial artery and its immediate surroundings, Vierordt,[3] von Basch,[4] Hill and Barnard[5] (small instrument), Oliver;[6] and (*b*) those in which the pressure is applied by a bag completely surrounding the limb or finger, or enclosing fingers, or the whole hand and forearm (plethysmograph); Riva-Rocci,[1] Hill and Barnard[2] (large instrument), Gärtner,[3] Mosso,[4] Marey.[5] The small instruments in group (*a*), one of which (von Basch) compresses the artery till the pulse beyond is obliterated, while with those of Hill and Barnard and of Oliver the mean pressure is determined by taking the reading at which the maximum oscillation is seen, give often considerably higher values than those in group (*b*) and are less reliable. The plethysmographic method (Marey,[6] Mosso)[7] is a purely laboratory method.

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[1] Wiener klin. Woch., April 7, 1904.

[2] British Medical Journal, April 22, 1905.

[3] Die Lehre von Arterienpuls, Braunschweig, 1855, p. 164.

[4] Loc. cit.

[5] Proceedings of the Physiological Society, Journal of Physiology, 1898, vol. xxiii. p. 4.

[6] Journal of Physiology, 1897, vol. xxii. p. 51.

But Riva-Rocci's[8] manometric method, with its rubber cuff for obliterating the palpable pulsation, and Hill and Barnard's[9] aneroid manometric method, with its encircling inflated india-rubber tube for the determination of the maximum oscillation as a guide to the mean pressure, are very fairly accurate (Riva-Rocci's, with an error of less than 4 per cent. varying with the individual tactile discrimination), provided (1) that the encircling pressure collar be not too narrow and (2) that the two free ends of it should overlap, failing which too high a reading is obtained.

Martin's special modification of Riva-Rocci's manometer is described,[10] and he mentions Sahli's "shortened pattern." Gärtner's ring sphygmometer for the finger, with which the blanching pressure has to be determined, is very convenient, but its ring is too narrow to avoid giving too high an estimate, and its "end-point reaction" is less delicate than that of the Riva-Rocci's, which it resembles in general description.

The maximum systolic pressure is the only point during the cardiac cycle which can be determined with accuracy without opening the artery. This conclusion is based upon the evidence of experiments specially undertaken by Martin with reference to this point. The position of the maximum oscillations is subject to variations which may introduce error, although in a general way Hill's contention is correct that they generally occur (in the Riva-Rocci instrument) about the mean pressure.

Theodore C. Janeway's modification[11] of Riva-Rocci's sphygmomanometer adds the advantages of portability and durability to those of accuracy and ease of working. Compactness and portability are also claimed by Henry W. Cook for his own pattern of Riva-Rocci's instrument, the only one besides Janeway's and Stanton's manufactured in America. With its help he has arrived at the following conclusions in relation to chronic arterial hypertension:[12] Etiological classes: chronic, etc.

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[1] Gazz. Medica di Torino, 1896, 1897.

[2] Lancet, 1898, i. p. 282.

[3] Wien. med. Woch., 1899.

[4] Arch. Ital. de Biol., 1895, vol. xxiii.

[5] Travaux du Laboratoire, 1880, vol. iv. p. 253.

[6] Ibid., 1876, vol. ii.

[7] Loc. cit

[8] Loc. cit.

[9] Lancet, 1898.

[10] Loc. cit., p. 868.

[11] Medical News, August 27, 1904.

[12] Journal of the American Medical Association, January 28, 1905.

Chronic hypertension may be divided into four classes, according to etiology; (*a*) arteriosclerotic; (*b*) cardiac, pulmonary, and cerebral compensatory; (*c*) toxic; (*d*) primary. The primary form of hypertension deserves recognition as a distinct disease. Its early treatment should avail to delay some forms of cardiovascular and renal disease. In correcting hypertension sodium nitrite has many advantages over nitroglycerin.

H. Sahli's[1] pocket mercury manometer is a welcome addition to the clinical arsenal; for, besides being portable, it can be connected with Riva-Rocci's, Gaertner's, or Basch-Potain's instruments.

MEASUREMENT OF THE DIASTOLIC BLOOD PRESSURE, in addition to the systolic, is part of the method described by J. Strasburger,[2] which needs to be studied in the original. He calls to aid the palpating finger instead of the manometer.

PRACTICAL POINTS IN CONNECTION WITH BLOOD PRESSURE. To secure the desired reduction of high tension, von Noorden[3] recommends the 5 per cent. alcoholic solution of nitroglycerin in preference to the tablets which are often inert. He has given as much as $\frac{1}{5}$ grain of nitroglycerin in twenty-four hours.

Robert H. Babcock[4] recommends attention to the pulse tension rather than the pulse rate, as a guide for the life insurance examiner.

Different positions of the body influence blood pressure and pulse rate, and O. Z. Stephens'[5] research has brought out the following points among other results; 1. The blood pressure increases in the brachials from the standing to the head-down positions, inclusively, in the following order: Standing, sitting, left lateral, right lateral, supine, and head-down. 2. The pulse rate decreases in the same order that the blood pressure increases. 3. The decrease in the pulse rate is a conservative act on the part of nature to protect the heart itself and the central nervous system.

THE FACTORS OF BLOOD PRESSURE. Cabot's[6] concluding paragraph is full of practical significance: "To me one of the most striking features of the investigation was the fact that while strychnine and whiskey seemed to be entirely without influence upon the blood pressure, the sight of the dinner tray or the prospect of getting up produced a most obvious, though transient, rise in the pressure. The only permanent gains in pressure occurred when the patient reached a crisis (as in pneumonia) or when convalescence enabled him to get up and walk." No physician can afford to neglect the psychical element in treatment; it may at times be more potent than any drug and the food that suits the fancy may be food indeed for the heart. This also throws light upon the collateral value of common salt at meals, which Oliver contends acts chiefly as a raiser of blood pressure, not improbably by pleasing the palate.

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[1] Deutsche med. Woch., 1904, Bd. xxx., No. 48.

[2] Zeit. f. klin. Med., Bd. liv., Heft 5 and 6.

[3] Journal of the American Medical Association, October 22, 1904, p. 1237.

[4] Medical News, April 23, 1904.

[5] Journal of the American Medical Association, October 1, 1904.

[6] New York and Philadelphia Medical Journal, July 9, 1904.

Constitutionally Low Arterial Tension, the "hypertension" of Huchard, is doubtless, as felt by Louis F. Bishop,[1] an important peculiarity to recognize and to bear in mind in any line of treatment we may recommend. Defective nervous control is among the symptoms noted by Bishop. His experience is in favor of systematic exercise rather than medicine.

Blood Pressure in Arteriosclerosis was not found to be invariably high by T. Dunin[2] in 440 cases examined with Gaertner's sonometer. It was normal or below normal in 120, and in 80 cases with low blood pressure anginal symptoms occurred. Quick pulse or even tachycardia prevailed in 40 out of 136 cases of high pressure; he regards this combination as leading up to symptoms of failure.

Hydrotherapy in Arterial Hypotension and Hypertension. Both conditions De Laussedat finds[3] to be favorably influenced by "carbogaseous" baths provided the mode of their administration be varied to suit the condition; but a general reservation is to be made in regard to cases of decided arterial rigidity. In hypotension the indication is a bath of sufficient duration and of temperature equal to that of the skin, gas being withheld at the beginning and gradually increased. In hypertension very short and very gaseous baths are to be used at first, greater advantage being gradually gained by prolonging their duration. The diuresis, which is always observed, is important, as it represents an antitoxic and excretory element of treatment.

Béni-Barde's[4] considerable experience in practical hydrotherapy gives weight to his remarks on its uses from the special standpoint of the vasomotor system. In neurasthenia the spray bath, with an initial temperature of 92°, to 99° is to be applied, with the avoidance of any shock, to the spine first (from above downward), next to the anterior surface of the trunk, and lastly to the trunk, for four to eight minutes, the objects being sedation and the promotion of sleep. But when the purpose is to stimulate, the temperature of the spray is varied through many degrees, great care should be taken, in all cases where cardiac symptoms exist, to avoid the application to the chest of any but the lightest touches of the cold douche, and to resort always to the soothing effect of the warmer current whenever any signs of overstimulation become apparent.

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[1] Journal of the American Medical Association, June 25, 1904.

[2] Zeit. f. klin. Med., Bd. liv., Heft 5 and 6.

[3] Bull. Acad. de méd., 1904, No. 25.

[4] Journal des praticiens, 1904, No. 21.

THE MECHANISM OF THE ADRENAL EFFECT UPON VASCULAR TONE needs further elucidation. James Barr,[1] who uses adrenalin as a vascular tonic, and for checking secretions from serous membranes, believes "that while adrenalin acts chiefly on the nerve endings, it has a direct effect on the unstriped muscular fibre, and is much more constant in its action than agents which act only through the vasomotor mechanism. It blanches fresh granulation tissue where there is no sympathetic nerve, and, perhaps not larger bloodvessels than newly formed capillaries."

Oliver and Schäfer's original conclusions were in favor of a direct action upon unstriped muscle. But R. T. Elliott, of Cambridge (quoted by Barr), has recently convinced himself experimentally that adrenalin only acts through the sympathetic nervous system. According to this, adrenalin would not take effect upon the coronary arteries (in cat, dog, or rabbit), nor upon the cerebral arteries (Leonard Hill), nor upon the pulmonary (Dixon), which are stated to be devoid of vasomotor nerves.

INTERRUPTED CIRCULATION. A therapeutic method of which I published a preliminary account in the *Lancet* of August 13, 1904,[2] consists in the systematic use of the elastic tourniquet to produce alternate anæmia and arterial hyperæmia. A good illustration of its effects was obtained in two cases of rheumatoid arthritis, but as that affection does not belong to the scope of this report, the reader is referred to the original or the abstracts. The same principle, which contrasts with that underlying Bier's "passive venous hyperæmia," explains the mechanism of the cure of a case of Reynaud's disease by Harvey Cushing by the elastic tourniquet, which was briefly noticed in PROGRESSIVE MEDICINE for September, 1904, p. 165.

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[1] British Medical Journal, January 14, 1905, p. 56.

[2] Therapeutic Gazette, 1905, p. 50.

DERMATOLOGY AND SYPHILIS.

BY WILLIAM S. GOTTHEIL, M.D.

DERMATOLOGY.

Actinotherapeusis.—This new method of treatment has received fairly thorough consideration in PROGRESSIVE MEDICINE during the last few years, and very satisfactory positive results have been recorded from experimentation done in various parts of the world.[1] It would serve no useful purpose to notice all the articles that have appeared during the past year; I shall mention only a few. The most important is in the form of a report from the Finsen Institute[2] at Copenhagen, which consists of a long and very convincing series of "before and after" pictures of cases of lupus vulgaris treated by the method. Unlike many similar medical pictures, these are very evidently bona fide photographs of the same cases at intervals of a year or more; they show the natural changes of feature, clothing, hair-dressing, attitude, etc., that is to be expected in pictures of the same person taken at long intervals of time. We must necessarily accept this evidence of the efficacy of the treatment. Nevertheless I do not think that the method has made any very great progress toward general acceptation during the past year. The reason for this is twofold.

In the first place its application has practically been confined to the treatment of *lupus vulgaris* and *tuberculosis cutis.* It does not seem to have proved very much superior to other methods in the various forms of alopecia, parasitic disease, rosacea, nævus, etc. I myself reported three cures of lupus erythematosus some time ago;[3] in one of these the disease subsequently reappeared. The cases that I have encountered during the last twelve months have all been unsuited for the treatment; either the circumstances have been such that a long and expensive course could not be undertaken, or the disease has been so widespread and disseminated in so many foci that it was out of the question to give the necessary attention to each one of them. And as the various forms of tuberculosis of the skin are not very common here, but few investigators have been at work.

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[1] PROGRESSIVE MEDICINE, September, 1903, 1904.

[2] Die Bekämpfung des Lupus Vulgaris; Finsen, 1903.

[3] International Journal of Surgery, October, 1903.

The second reason is of greater moment. The treatment is expensive in every way. The apparatus is costly; the amount of current used is large; the sessions must be long, frequently repeated, and continued for lengthy periods. Hence, it is not suited for the physician's office and for the ordinary patient. Several patients that I have seen during the past year have preferred to go to Copenhagen for treatment; they have felt that if it does require so large an expenditure of time and money they preferred to take a vacation and a trip abroad with it. Only wealthy people can undertake the Finsen treatment in private practice. It is essentially an institution method, and America is far behind the European countries in this respect. There are flourishing Finsen Institutes in most of the European capitals. Lupus is serious enough, the cases are numerous enough (there being far more of them than is generally supposed), and the remedial measure well enough established to warrant the foundation of Finsen Institutes here.

Marie[1] describes a new apparatus for the light treatment, which, however, does not seem to possess any especial advantages over those already in the market. Kellermann[2] reports good results in 35 cases of various dermatoses and nervous affections; he claims to have had especially good effects in eczemas and neuralgias; the healing of chronic leg ulcers was markedly hastened. Roger[3] has employed the treatment in various affections of the genitals, chancres, herpes, and chancroidal and phagadænic buboes with good results; but his method was really a cauterizing one, since he uses a 300-candle-power light at a distance of two or three inches. Pospelow[4] showed a case of that very recalcitrant affection, psoriasis of the nails, at the Moscow Venereal and Dermatological Society on March 4th, of five years' standing, and in which the usual internal and external treatment had been entirely ineffective. There was very marked improvement after a few light baths, together with paintings of 5 per cent. chrysarobin traumaticin. Britschew[5] cured a case of general psoriasis with seventeen light baths (cabinet). Torök and Schein[6] advocate actinotherapy in severe and obstinate cases of acne. It has no antiparasitic effect, they say, but it diminishes the sebaceous secretion from the increased cornification of the parenchyma that it occasions. Montgomery[7] saw improvement in an extensive case of vitiligo from its use. Other similar reports have been published by François,[8] Carle[9] and others.

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[1] Annales de dermatologie et de syphiligraphie, May, 1904.

[2] Centralblatt f. die gesammte Therapie; Dermatologisches Centralblatt, March, 1904.

[3] Ibid. [4] Dermatologisches Centralblatt, March, 1904. [5] Ibid.

[6] Wiener klin. Rundschau; Journal of Cutaneous Diseases, March, 1904.

[7] Monatshefte f. praktische Dermatologie, March, 1904.

[8] Ibid., November 15, 1903. [9] Ibid.

The only important novelty in methods proposed during the year has been the attempts to sensitize the tissues to the light rays according to the method of Dreier. Spiethoff,[1] as the result of his experiments made on 6 lupus cases in Lesser's clinic, reports adversely to it. But Tappeiner[2] has obtained good results in cancerous and other growths by the use of a 1 per cent. eosin solution to enhance the actinotherapeutic action. Neisser and Halberstaedter[3] used a 1 : 1000 erythrosin solution by superficial or deep injection in 23 cases, treating the parts with the light two to five hours later. They claim to have secured a more marked reaction and a much deeper effect.

Perhaps the most important paper of the year is the report made by Forchhammer and Reyn[4] to the Fifth International Dermatological Congress, held at Berlin in September of last year. They conclude as follows:

1. There have been no especially advantageous results from the employment of iron electrodes, as proposed by Bang and others.

2. It is by far the best possible treatment for lupus vulgaris and all other forms of cutaneous tuberculosis.

3. It effects improvement in (*a*) lupus erythematosus, but is less certain in its action here than in lupus vulgaris, and is ineffective in the inflammatory cases. (*b*) It is perhaps useful in superficial epitheliomata. (*c*) It is serviceable in rebellious cases of acne vulgaris, especially in connection with the local use of sulphur. (*d*) In rosacea it is beneficial only when there is coincident infection; scarification and galvanopuncture are also needed. (*e*) In keloid they noted a favorable result in one case only. (*f*) In alopecia areata it prevents extension in recent cases, but does not prevent relapses. (*g*) In flat angiomata it causes paling and improvement; there are no scars, but long treatment is required. (*h*) In other dermatoses the results are still undecided.

In the discussion that ensued Schiff stated that he had been working of late with mercury arc electrodes, which he believed transformed one-third of all the energy into ultraviolet rays. Lesser emphasized the fact that mere tediousness was an argument of but little weight in a disease like lupus, in view of the results attained. Von During had gotten good results in rosacea, and held that the Bang electrodes were not so good as the original Finsen model of instrument. Scholtz had cured alopecia areata by the method.

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[1] Berliner klin. Wochenschrift; Journal of the American Medical Association, August 27, 1904.

[2] Münchener medicinische Wochenschrift; Journal of the American Medical Association, July 30, 1904.

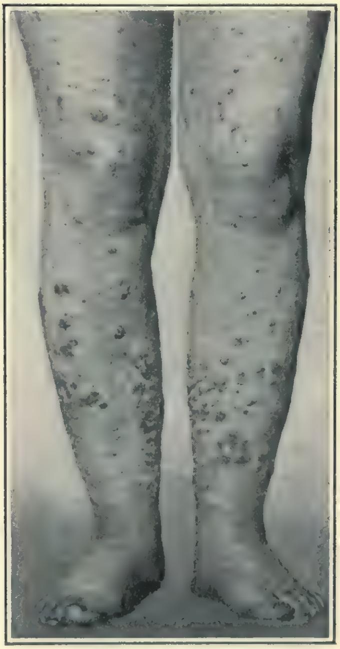
[3] Deutsche medicinische Wochenschrift, 1904, No. 8.

[4] Annales de dermatologie et de syphiligraphie, October, 1904.

Bromide Eruptions.—The ordinary pustular acne from bromides is, of course, familiar to us all; it is so common that there are authorities that claim that it appears to some degree in 75 per cent. of all cases in which the drug is administered.[1] But even the more unusual forms are of not very infrequent occurrence; and they are of importance from the fact that they are not infrequently wrongly diagnosed and, hence, improperly treated.

The crusted variety like that recorded by Wallhauser and noted in the review of 1903[2] is perhaps the next in frequency; and the experience of the last few years would lead me to believe that the tuberous and vegetating form is not very uncommon. I see a case or two every year. The fleshy pink, tuberous excrescences are very characteristic; they resemble no other dermal lesion, and once seen and recognized can hardly be mistaken. I append a picture (Fig. 13) of one of my cases.

Fig. 13



Bromoderma pustulosum
(Author's case.)

Myers[3] has lately reported a typical case; and he also notes the occurrence of a varicella-like eruption from the same drug. Hallopeau and Teissiere[4] showed a case before the French Society of Dermatology and Syphilis on May 5th of last year in which extensive gangrene of the skin occurred as a complication of bromoderma.

As is so often the case with dermatoses, treatment is very simple when the correct diagnosis is made. The bromide must be stopped at once, and altogether, since a very small amount of the drug may cause the eruption. I have known it to appear after three two-grain doses only. A 5 per cent. salicylic acid-zinc dusting powder, or a salicylic acid paste can be used, which gradually causes the fleshy excrescences to shrivel up. In obstinate cases the lesions may be curetted under local anæsthesia before using the powder or the ointment. In the course of time they disappear entirely, leaving only a stain that gradually fades away. Treatment must be persisted in for many weeks; for results without scarring and deformity can only be attained slowly.

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[1] Progressive Medicine, September, 1903, p. 124.

[2] Ibid., p. 123.

[3] Journal of Cutaneous Diseases, May, 1904.

[4] Annales de dermatologie et de syphiligraphie, May, 1904.

Dermatitis Atrophicans.—It appears that in certain cases atrophic changes of the skin may occur in consequence of the *x*-ray treatment. Schmidt[1] has seen it on the hands after a single but prolonged exposure (half an hour). There was first the ordinary dermatitis, followed by a bluish discoloration, and finally a permanently atrophic and wrinkled condition of the skin was left. The trouble is that we have no criteria to warn us of the probable onset of this very undesirable effect of the treatment. Other similar cases have been reported; and I have seen a number of cases in which the skin was left dry, wrinkled, and telangiectatic after the use of the rays.

Lehmann[2] has made an histological study of the condition; and Ravogli[3] records a case of his own in which the inflammatory symptoms, as evidenced by the reddish-brown, erythematous lesions at the advancing margins of the disease, were marked. In the review of two years ago[4] I called attention to the inflammatory process that marks the advancing margin of the disease in most of the cases. I expressed the opinion that these cases in their earliest stages would naturally be taken for instances of simple erythematous eczema; since it takes a long time, usually some years, before the atrophic changes become marked.

Pissonany's case[5] is characteristic; the patient was a woman, aged seventy years, and the disease had begun thirty years before with red, spreading spots. It belongs, like most of them, to Mestschersky's type of erythematous idiopathic atrophy of the skin. Cases that are not thus inflammatory in the beginning and at the advancing margin of the disease, but are purely atrophic throughout, belong to a different class; and those in which the characteristic lardaceous infiltration is present, with consecutive atrophy only, are better classed as scleroderma.

Mestschersky,[6] after a careful study of a case, concludes that it is a chronic dermatitis in the beginning, though in some cases the redness and infiltration is barely noticeable. He considers the disease the same as the erythromelia of Pick and the chronic acrodermatitis of Herxheimer. Here, as in many other instances, dermatology is unfortunately suffering from a plethora in terminology, to the confusion of the student and investigator.

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[1] Dermatologisches Centralblatt, May, 1903.

[2] Inaugural Dissertation, Leipzig; Monatshefte f. praktische Dermatologie, November 1, 1903.

[3] Journal of the American Medical Association, June 10, 1903.

[4] PROGRESSIVE MEDICINE, September, 1903, p. 121.

[5] Archiv f. Dermatologie und Syphilis, August, 1903.

[6] Dermatologisches Centralblatt, June, 1904.

Riehl,[1] in his consideration of idiopathic atrophy of the skin, does not feel certain that inflammation invariably precedes the atrophy, though this is usually the case. He claims that there is a stage of diffuse, non-inflammatory infiltration, which would certainly make the affection very difficult to differentiate from scleroderma.

Fordyce[2] accepts the fact that the atrophy is the terminal stage of a primarily inflammatory condition. The case on which his study is based showed profound involvement of the nervous system; it seems probable that syphilis was the cause of this latter, and possibly of the skin lesions as well. Clinically, however, the case was indistinguishable from other instances of idiopathic atrophy; and this opens up an interesting field of study as to the etiology of this obscure affection.

One fact, however, we can regard as established; and that is that, in the majority of the cases at all events, the atrophy is not idiopathic at all, but is consequent to inflammatory changes, possibly of specific origin. The mistake arose from the fact that the first cases described were old ones of long standing, in which the retrogressive changes formed almost the entire picture of the existing disease. Idiopathic atrophy is, therefore, an unsuitable designation, and dermatitis atrophicans seems at present the best name for the condition at our disposal.

Diet in Dermatoses.—Under this heading Lassar[3] has written a noteworthy article. The subject is one of importance, as our patients appreciate when they inquire about it, as they often do; but the physician usually dismisses it with a word. It is entirely too large for any exhaustive consideration here; but I may call attention to a few of the author's salient points.

It is held by many that meat, more especially when freely indulged in by persons of sedentary habits, has a bad effect in psoriasis; and I may add that the more chronic forms of eczema and seborrhœa come in the same category. Cheese is apparently a direct cause of certain dermatoses, notably furunculosis, and should always be avoided in this condition. I have met with more than one instance in which indulgence in even the smallest amount of this food was immediately followed by the outbreak of a crop of pustules. It should, therefore, be prohibited in this as in all the other acute pustular dermatoses. All the erythemata and acute exudative rashes are benefited by restriction of diet; in bad cases a modified or purely milk diet is an important part of the treatment. These maladies being largely dependent on or influenced by intestinal autointoxication, they are benefited, in addition to the regulation of the food, by calomel purgation followed by salines, and by the administration of salicylic acid, which acts as an antitoxin to the poisons in the blood.

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[1] Archiv f. Dermatologie und Syphilis, May, 1904.

[2] Journal of Cutaneous Diseases, April, 1904.

[3] Dermatologische Zeitschrift, 1904, No. 3.

Phlegmon, furunculosis, and various forms of dermatitis and eczema are very prone to occur in gouty, rheumatic, and diabetic subjects, and require the dietary appropriate to the underlying pathological condition. An excess of sugar more especially in the tissues renders them good culture media for the pus organisms; and the same is true of urea. Intestinal fermentation may be an essential factor in eczema; in the common infantile varieties more especially it is a matter of general experience that all our remedies are of but transient effect until we succeed in regulating the feeding and putting the gastrointestinal tract in a healthy condition.

As a general rule for all the dermatoses, the patient should be made to restrict the diet carefully to the foods that agree perfectly, and take small meals at regular and not too frequent intervals. A single hasty meal taken when overfatigued, overheated, or irritated may affect him injuriously enough to determine the recrudescence of a disappearing eruption and change his condition for the worse.

Eczema Metastasis.—Though fully aware of its inaccuracy, I employ this term to designate certain supposed systemic ill effects caused by the cure of an eczematous or other dermatosis. We have regarded the old idea of the dangers of these diseases "striking in," as it was called, as entirely antiquated in the profession, though it still retains its hold on a considerable section of the laity. Yet Feer[1] reports 8 cases from the Basle Children's Hospital in which death occurred after the cure of an eczema; and he has found 22 similar cases in the literature. In a number of them there was enlargement of the thymus, but no other trouble of any kind. Some died of pleurisy and bronchopneumonia; in others there was no demonstrable cause of death. Butte[2] thinks that there may be something in the old idea, and cites 2 fatal cases of his own. He holds that eczema is caused by internal toxins excreted by the skin; and he believes it possible that in certain cases the sudden and complete stoppage of this elimination may have deleterious effects. De Amato[3] also believes in eczema metastasis, especially in children and the aged; he holds that there is a reciprocal relationship between the eczema and the bronchopneumonia, asthma, gout, rheumatism, etc., in these cases. His idea is similar to that of Butte; the dermatosis is a skin reaction to toxin elimination; and he goes to the extent of warning us against too vigorous treatment, especially in the eczema capitis of infants. He lays stress on the diet for both the mother and the child in these cases, and only treats the eczema locally when the other conditions have been set entirely right.

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[1] Correspondenzblatt f. Schweitzer Aerzte, xxxiii., No. 24; Journal of the American Medical Association, April 16, 1904.

[2] Annales de therapeutique dermatologique et syphiligraphique, vol. iv. No. 7.

[3] Monatshefte f. praktische Dermatologie, March 1, 1904.

It is interesting to see an old and abandoned theory crop up rehabilitated like this; but I am afraid that we must regard these observers as mistaken in the conclusions that they draw from the cases that they record. With two such common affections as eczema and bronchopneumonia, of each of which there must be hundreds of thousands of cases in the civilized world every year, there will necessarily be some cases of their coincident or consecutive appearance. The same holds true of the other affections. Nor is it strange that a few cases of death without demonstrable cause after the cure of an eczema have been observed. The same thing happens without precedent eczema, as those of us who have had occasion to see much postmortem work are well aware.

On the other hand, innumerable cases of eczema of all varieties and at all ages have been and are being cured, not only without deleterious effects, but with demonstrable benefit of every kind. Jadassohn only voices the general opinion when he states, apropos to Feer's article, that he has never seen an eczema death. The subject would hardly be worthy of consideration in these pages had it not been seriously dealt with by these authorities. There is some little danger also that medical opinions of this kind may gradually reach the laity, and intensify the strength of erroneous notions that to some extent interfere even to-day with the proper treatment of these cases.

Facial Cosmetics.—We are not infrequently consulted by women as to the general measures to be taken for the care of the skin and the preservation of its health and good appearance, as well as for the relief of slight abnormalities and defects. It is a mistake, I think, to dismiss the subject as unimportant and unworthy of consideration, since even trivial defects of the complexion are sources of much anxiety and mental trouble to sensitive females.

The prejudice against the use of soap and water on the face confronts us continually, and must be as continually combated. Of course, there are skins on which ordinary soap and water has an irritant effect; but this is almost always due to the employment of improper materials for the purpose. The face is exposed more than any other part of the body except the hands to the noxious influences of the atmosphere dust, dirt, etc.; it is abundantly supplied with large sebaceous glands; and it will be benefited and not harmed by a thorough cleansing once a day done in the proper manner. But the water must not be hard, since it then tends to make the skin rough and coarse. Hard water should be boiled before using, or a small amount of soda or potash added to soften it. A pure neutral soap is the best to use, since an excess of alkali renders soap irritant. Strongly alkaline soaps or green soap, pure or in the form of the tincture, are only to be employed when there is a marked excess of oily secretion on the face. When the tendency is to a seborrhœa of the dry, scaly variety, and the skin is rough, thickened, and harsh, finely powdered pumic stone, or a soap containing marble dust or sand will render good service.

When the stronger alkaline soaps are used, and in all cases in which the skin becomes dry and harsh after the washing, I am in the habit of ordering the inunction of a very small amount of pure almond oil with a few drops of oil of rose after the face has been washed and dried. It is well not to deprive the superficial epidermis too entirely of its fat. Carefully innuncted and well rubbed off, this can be done without making the face look greasy; and there is no objection to the subsequent employment of a suitable face powder in small amount, which will then adhere properly to the skin.

As regards face powders, the only one that I recommend is very finely powdered starch. The scented commercial preparations are very liable to contain mineral and other matters that have an injurious effect upon the skin.

The ordinary toilet waters are, as a rule, to be avoided entirely. They often contain an excess of alcohol or other ingredients that are liable to be harmful. If one must be employed I write for the following: Boric acid, 1; rose-water and Cologne spirit, āā 5; distilled water, to 100 parts. This will do no harm. I prefer, however, to direct the patient to add from a half to one teaspoonful of the compound tincture of benzoin to a basin of warm water, and have her sponge her face with this. This forms an excellent bleacher and complexion improver.

Occasionally, though rarely more than is commonly supposed, we meet with cases in which even the mildest soaps seem to irritate. Here a superfatted soap is in place; the following is a good formula: Beef-tallow, 39.3; olive oil, 7.4; potash lye (28° Baumé), 11.1 parts.

Jackson considers the subject of facial cosmetics in a recent article,[1] but devotes his attention more especially to lesions that are perhaps better considered under the heading of the various diseases. *Warts* of the ordinary variety are to be curetted, and their bases touched with pure carbolic or glacial acetic acid, or covered with a concentrated salicylic acid collodion. This process is to be repeated as often as is necessary. I prefer to use Unna's "microbrenner" modification of the Paquelin, or, better, the microcautery I devised some years ago[2] for the destruction of the hypertrophied papillæ. Senile warts Jackson recommends us to leave alone; if something must be done a strong salicylic acid collodion can be applied. Growths of this kind that show a tendency to increase in size are to be regarded and treated as epitheliomata; in this I quite agree with the author. I have repeatedly advocated the employment of the caustic treatment in this class of cases.

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[1] Monatshefte f. praktische Dermatologie, May 1, 1904.

[2] Journal of Cutaneous and Genitourinary Diseases, October, 1899.

For nævi Jackson uses liquid air, no matter whether the lesions are pigmentary, vascular, or hairy. I have had no personal experience with this agent, since even in New York it is difficult to obtain and keep on hand. Its use is certainly out of the question in general practice. The electrolytic needle and the microgalvanic or Paquelin cautery are quite sufficient in the class of small growths under consideration.

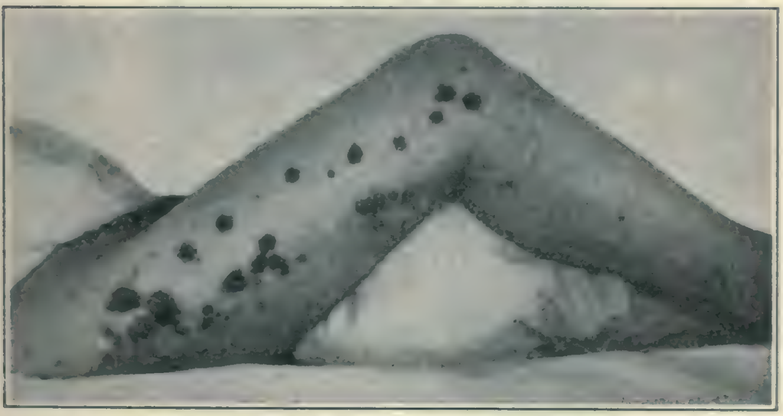
Lentigo, or freckles, is an unsatisfactory condition to treat, since it is so prone to return after removal. A strong peroxide of hydrogen solution used persistently will bleach them; or the epidermis with the pigment accumulations can be removed by the use of one of the peeling pastes recommended for acne. In bad cases I am in the habit of prescribing a peeling paste as follows: Betanaphtol, 1; sulphur præcip., 3; green soap and vaselin, āā 2 parts. This is left on the face for a time varying between six and forty-eight hours, depending on the dermal reaction. I direct the patients to apply it early in the day; if by nightfall there is marked burning and reddening of the skin, it is removed with oil and cotton, and a mild dusting powder applied. If there is no reaction by nightfall, the paste is left on until morning. Next day the process is repeated until a good dermal inflammation is obtained. Then the dusting powder, or, if there is very much reaction, boric acid or zinc ointment is used. The skin peels in large, thick flakes, bringing the superficial pigment with it. For the prevention of a renewed appearance of the freckles as far as possible a dark veil should be worn when exposed to the sun, or the face may be painted with the following: Calomel, 1.3; zinc oxide, 4; glycerin, 8; aq. calcis, 24; aq. rosæ, 12 parts.

Superfluous hair is best removed by electrolysis; but great skill and practice is required to get permanent results without scarring. Repeated cautious depilation with the *x*-ray is said to finally yield permanent results; and cases have been reported in which patients have been satisfied to undergo radiotherapeutic epilation two or three times a year, which has sufficed to keep their faces clear of hair.

Gangræna Cutis Multiplex.—Under this heading we group a number of cases in which, from causes as yet obscure, gangrene occurs in localized and usually multiple areas of the skin. We exclude from the category the local necroses caused by chemical, thermic, or mechanical influences, as well as those that accompany diabetes, Raynaud's disease, hysteria, etc. Reddish spots or urticaria-like infiltrations appear spontaneously, and without sensory disturbance; with or without the appearance of vesicles or bullæ and within a few hours they change into dry, depressed, yellowish or brownish-black areas of necrosed and firmly adherent skin. These are slowly cast off by reactive inflammation. As a rule, the affection is a chronic one, lasting for months or years with continuous involvement of fresh areas of skin; but in a number of cases of multiple cutaneous gangrene other affections have been concomitant or supervening, and a fatal termination has ensued. Such was the case with the patient here pictured (Fig. 14), who entered the hospital suffering from delirium tremens, so that no proper history of the dermal affection could be gotten, and soon developed a pneumonia that carried him off.

There were numerous areas of necrotic skin on the limbs and various other parts of the body; and in some places it looked as if a local hemorrhage had preceded the grangrene, and the process had commenced as a purpura of malignant form.

FIG. 14



Gangræna cutis multiplex. (Gottheil's case.)

Several cases of the affection have been reported during the past year or two. Bronson[1] had a case in which the anterior surface of the tibia was affected; an unusual site. Duhring regarded it an erythema gangrænosum rather than an example of true multiple neurotic gangrene. Latte[2] reports 3 cases of multiple cutaneous gangrene; but they all 3 occurred in hysterical women, and were possibly self-inflicted. Brandweiner[3] notes a case of four years' standing, in which the lesions looked at first like those of zoster, though each one ended in superficial gangrene. There is, of course, a gangrenous zoster, mild forms of which are not very uncommon, and in last year's issue of PROGRESSIVE MEDICINE I noted and figured two personal cases of traumatic gangrene of the skin.[1] There is, however, a real idiopathic multiple gangrene of the skin, though it is of very rare occurrence.

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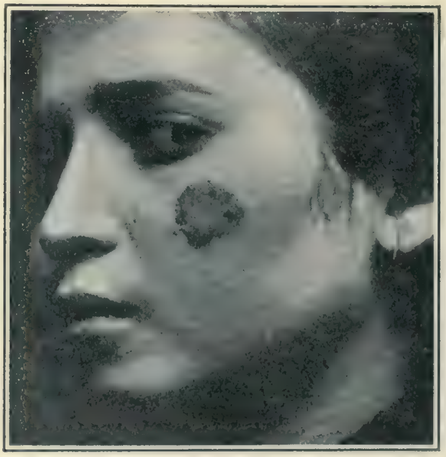
[1] Journal of Cutaneous Diseases, October, 1903.

[2] Journal of American Medical Association, November 12, 1904.

[3] Ibid.

Lupus Vulgaris. TREATMENT.—After all these years of work upon it this subject still remains under discussion; proof that we are far from having definitely fixed ideas concerning it. Hoy[2] has lately used turpentine locally in several cases, employing picric acid gauze or cotton to keep the application in place. He reports rapid and satisfactory healing of the ulcerations, and no relapses. Let us hope that this is not merely another of the numerous measures that seem to be successful chiefly in the hands of their originators.

FIG. 15



Lupus vulgaris. (Gottheil's case.)

The method of election, of course, is the Finsen treatment (see Actinotherapy). It is, however, beyond the reach of American practitioners at present, and we must have recourse to other measures.

Dreuw[3] announces that he has devised a simple, inexpensive technique which has proved effectually curative, and can be applied by any practitioner. It consists in first freezing the part with ethyl chloride, a treatment that he has long advocated, and then rubbing in crude hydrochloric acid saturated with free chlorine. The acid causes an immediate and very extensive leukocytic emigration. Even old lupus cases yield to this treatment; and in three patients treated over a year ago there has been no tendency to relapse. For tuberculous abscesses and fistulæ

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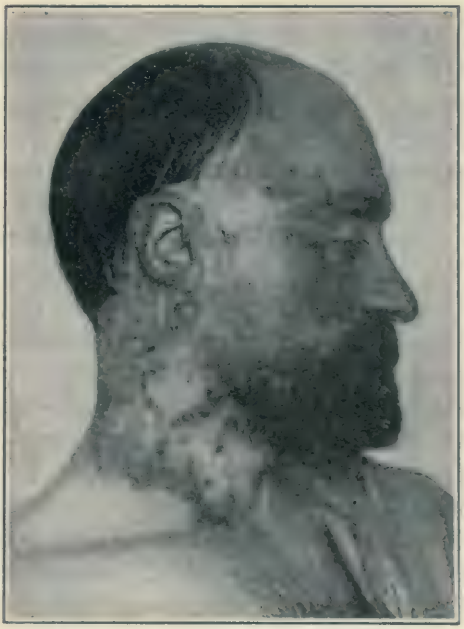
[1] PROGRESSIVE MEDICINE, September, 1904, p. 116.

[2] Therapeutic Gazette, May 15, 1904.

[3] Berliner klin. Wochenschrift, 1904, No. 47.

Dreuw recommends the same treatment under narcosis; and he advises, though he has not tried it, its combination with phototherapy. I am afraid that it is entirely too severe, especially for employment about the face, which is the region most commonly affected. To first freeze a patient's nose and then to rub in crude hydrochloric acid would be liable, I am afraid, to cause a very undesirable amount of reactive inflammation, and possibly even sloughing. It would certainly cause much scarring; and if we are willing to have that there are many other more manageable caustics and cauterants that we can employ.

Fig. 16



Lupus vulgaris. (Gottheil's case.)

At the International Congress of Dermatology held at Berlin in the fall of last year Morris[1] reported this subject exhaustively. His consideration of all the treatments recommended for lupus vulgaris during the last twenty-five years led him to the following conclusions:

1. Chemical caustics can only be considered as good adjuvants to phototherapy. Pure pyrogallic and pure salicylic acid must be placed in the same category. Of the commoner caustics, the acid nitrate of mercury leaves especially undesirable scars; the other acid or alkaline caustics are preferable.

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[1] Lancet, October 22, 1904.

2. The galvanocautery is one of our best measures when phototherapy and radiotherapy are inapplicable. It can be precisely applied, and the pain that it occasions is very transitory.

3. Scarification is of diminished importance since Finsen's discovery, and is less used.

4. Curetting is rapid and sometimes useful. It must be followed by energetic cauterization with pyrogallic acid or chloride of zinc or fuming nitric acid. The last agent is especially good for small nodules. Thorough employment of this method requires general anæsthesia; it leaves bad scars.

5. Excision can be employed on the trunk and limbs, when the disease is not too extensive.

6. Phototherapy (actinotherapy) is the most satisfactory of all the methods of treatment, but it is not more infallible than the others. The cicatrices are good. It has practical disadvantages, however, which limit its employment.

7. Radiotherapy (x-ray) is better than the Finsen treatment for ulcerated surfaces and for the mucosæ. It is more rapid than actinotherapy.

8. Tuberculin does not cure these cases, but Morris thinks that it helps the other remedies.

Morris ends his article as follows:

(*a*) In spite of the improvements in treatment during the last twenty-five years, relapses are still the rule.

(*b*) We cannot promise a cure save in the case of small chronic, torpid patches.

(*c*) In extensive lupus of the face the Finsen treatment and the x-ray are to be employed; they must be used for very long periods of time.

(*d*) Thermic and chemical caustics can be used to hasten results.

(*e*) General tonic treatment is required in extensive cases.

(*f*) Many cases are still incurable, though there are less of them than formerly.

I think Morris' conclusions in the main represent the best dermatological opinion on the subject. The only exception I would make is as to the value of tuberculin. I am inclined to think that it has none at all in tuberculosis of the skin.

Nævus, Vascular and Pigmented.—While moles of the pigmented and hairy varieties in the newborn and in infants may be left alone for cosmetic treatment, if required, in later life it is different with the chiefly or entirely vascular varieties. These are liable to extend quite rapidly, being in some cases apparently angiosarcomatous in structure rather than simple vascular overgrowths. They should be watched carefully, and active interference should be instituted as soon as we are positive that they are increasing in size. There is no objection to commencing treatment very early; I have begun with a number of them at the fourth to the sixth week of life.

In previous reviews[1] I have referred to various methods of treatment, more especially the electrolytic, advocated by Rockwell and others. Griffiths[2] has successfully employed Wyeth's hot-water method in a half-dollar sized nævus of the scalp and a venous nævus of the tip of the nose. He injected about a drachm of sterilized water at a temperature of from 180° to 200° without anæsthesia. The nævus becomes tense, blanched, and cystic after the treatment. Three days later the growth was mottled white and the swelling was gone. Other injections were necessary at intervals of a few days, but the amounts of fluid employed in the later ones were much less. It is important to have the fluid as near the boiling point as possible, to secure prompt and firm coagulation and to prevent the occurrence of embolism. I have had no personal experience with this method. There is necessarily some difficulty in the technique in handling an injection fluid so near the boiling point, and I have heard of more than one case in which extensive sloughing occurred in consequence of the injections. This is a matter of extreme importance when the nævus, as is often the case, is situated upon the face. The growths are disfiguring, and possibly dangerous; but we will hardly be thanked for relieving our patients from them at the expense of a long and tedious necrotic process, and with a permanently deforming result. I would reserve the injections for cases not amenable to other treatment only; and I should make exactly the same criticism of the pure alcohol injections that have heen advocated for these growths.

Frattini[3] and others again advocate the treatment first advised by Monteggia in 1857, and revived by Piorani in 1882 and later again by Unna, of painting the nævi with corrosive sublimate in flexible collodion. He uses a 6 per cent. solution and applies it every third day until the slough separates. Then an antiseptic dressing is applied. Frattini claims to have had 30 successful cases. I can only say that I have tried it in a number of cases, with varying strengths of sublimate, and without any result at all. Some slight local inflammatory reaction occurred with the stronger applications, and there was a little crusting; but the action of the application was entirely superficial, and there was absolutely no effect on the redundant vessels themselves. Unna has laid stress on the employment of non-flexible collodion as the base, claiming that the constringing effect was of importance. I have tried this also, without any better results.

The Roentgen treatment has been a good deal advocated in this as in other intractable dermal lesions. Levack[1] has cured 3 cases of nævus flammeus of the face and body, but at the expense of prolonged ulceration and permanent scarring. But if a destructive inflammation is required we have far better, surer, and safer agents for effecting it than the *x*-ray. The chemical caustics, nitric and trichloracetic acid, and more especially the galvanocautery, are quicker of action, more certainly limited, and just as efficacious.

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[1] Progressive Medicine, September, 1902, p. 184; September, 1903, p. 151.

[2] New York Medical Journal, May 2, 1903.

[3] Gazzeta degli Ospedalia; Medical Review of Reviews, November 25, 1903.

As regards the use of the *x*-ray in general in the treatment of nævus the reports are not very satisfactory. Allen[2] has had decided improvement in one case, but he supplemented the treatment with that by the electrolytic needle and the actinic ray lamp. The other reports, such as those of Dickson and of Taylor, are the usual ones of "improvement;" Jutassy records "paling;" but no one of authority definitely records cures of vascular nævi by this means. In the hairy varieties, of course, depilation can be effected by radiotherapy; and possibly some effect in the way of endarteritic inflammation and thrombosis can be obtained. But the Roentgen treatment cannot be regarded as satisfactory for nævi in general.

A similar criticism holds good of the actinotherapeutic method after Finsen. Heidingsfeld and Allen report "some success;" but the latter author here again uses electrolysis as well, and I believe that what good results he has had are to be attributed chiefly to this latter. The use of radium in these as in other conditions is of entirely problematic efficacy at this present writing. What little I have heard and seen of its so-called effects do not dispose me to regard it with favor. The high-frequency current applied by means of a small-pointed carbon electrode is effective in the smaller vascular nævi; but its action is that of a cauterant and I do not think that it presents any advantages over the galvanocautery described above.

There remains to be mentioned the treatment with the application of strong solutions of hydrogen dioxide. Cohn[3] used a 30 per cent. solution, applying a single drop twice a day with a glass rod, and allowing it to dry *in situ*. He claims to have gotten good results even in extensive cases. It is only recently that solutions of this strength have been obtainable. I have used the 25 per cent. peroxide in 3 cases, but have not been impressed with the results. It causes blanching of the tissues, and the lesion appears to be improved; but when treatment is stopped the condition remains about the same.

As a matter of fact there is no better treatment for smaller nævi, and even for large ones if they are treated in sections, than the cautery, provided a suitable instrument is employed. The ordinary Paquelin is entirely too large and clumsy for delicate work, such as is required around the face; and the left hand is needed to compress the bulb. The galvanocautery handles and knives are suited for larger work only, and the heavy and stiff conducting cords interfere still more with delicate manipulation. Unna devised a microcautery of the Paquelin type some years ago; but the instrument has not found any extended acceptance, largely, I think, on account of the rapid deterioration of the copper caps under usage.

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[1] Medical Standard, April, 1903.

[2] Radiotherapy and Phototherapy. Philadelphia, 1904.

[3] Journal of the American Medical Association, January 9, 1904.

I had a cautery made for me by the Wappler Electric Controller Company in 1899 (Fig. 17), which I have used continuously since that time and which I have found entirely suitable for the work.[1] The cautery handle is of hard rubber, four inches long, and shaped like a carpenter's lead-pencil. It can be held like a pen, with the little finger and the edge of the hand resting on the adjacent tissue; the current is controlled by a button immediately under the index finger, and flows only when contact is made by depression. The spring is light, and contact is instantly made and broken; and this, in combination with the extreme lightness and handiness of the instrument, permits the manipulation of the cautery with the utmost rapidity and delicacy. The contacts under the button are a fruitful source of trouble in instruments of this kind. A minute arc is formed as the current is made and broken; corrosion occurs, no matter what metal is employed, and the oxides formed are non-conductors and interfere with the flow of the current. The contacts here are made of platinum, as the most resistant metal; and they are so arranged that they may be rubbed against one another by lateral motion of the button, and thus freed of the oxides adherent to them.

FIG. 17

Gottheil's microcautery.

Posteriorly the handle terminates in two slightly diverging binding posts for the cords; in front are two short arms coming close together, and terminating in small bulbous ends containing the orifices for the points and the small watchmaker's screws by which these latter are held in place. The cautery points themselves are made of iridoplatinum wire, and are fashioned as required. From No. 22 to No. 30 wire can be used, so that all shapes of points can readily be made. The wire is heated, and is then bent with a small pair of plyers or beaten with a small hammer into the required shape.

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[1] Journal of Cutaneous and Genitourinary Diseases, February 1899.

The cords are much thinner and lighter than is needed for the heavier cauteries, and they are very flexible, so that they do not in any way interfere with the free manipulation of the instrument. For source of power I employ the street current with a motor generator and transformer. Several forms of such apparatus, and of moderate price, are now on the market. It is the most convenient source and has never once given me any trouble during the ten years or more that I have been employing it. But storage batteries or any other device for heating the knives may be used where the street current is not available. Only from 2 to 4 volts are required. The knives made of the lighter wires, from No. 26 on, will run on one storage cell; the lower heavier wires require two.

Reviewing the entire subject of the treatment of these abnormalities I can formulate the following conclusions:

1. The Roentgen treatment is effective in the hairy varieties of nævus for depilatory purposes; it can be tried in the other and in the mixed forms, but must not be pushed to the extent of causing ulceration. High-frequency currents, the actinic light, and radium are not as yet of proven efficacy.

2. Local treatment with sublimate collodion has not been successful; nor have I had any satisfaction from the use of the strong peroxide solutions.

3. Hot-water injections are to be used only in cases that are not amenable to other treatment. The possibility of undesirable effects must be kept in mind, and they should not be used on the face.

4. Electrolysis, as previously described,[1] and the chemical and actual cauteries are still our most reliable remedies for this class of deformities. The first is the treatment of election, more especially for lesions upon the face.

Nail Affections.—Perhaps the most unsatisfactory field in the entire range of dermatology is that of the disease of the nails. Even its symptomatology is ill-defined, so that differences of opinion as to the nature of the affection in any given case are very common, and in many instances it seems impossible to make a definite diagnosis, and treatment is entirely empirical and very unsatisfactory. Among the commoner nail affections are the various forms of atrophy, the parasitic affections, ringworm and favus, eczema and psoriasis, syphilis, dermatitis exfoliativa, lepra, onychogryphosis and other hypertrophies, together with the onychias and paronychias due to pyogenic infection of the nail-bed and the periungual tissues. There is but one fairly exhaustive book on the subject that I know of, and that was published by Heller in 1900; it has not yet been translated, so as to render it accessible to Englsih readers.

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[1] Progressive Medicine, September, 1902, p. 173.

The diagnosis of these affections is often a matter of great difficulty, except when they occur in conjunction with lesions of the general integument. When the nails alone are involved it is not infrequently impossible to make a satisfactory diagnosis. Several articles upon the subject have appeared during the last year or two. That of Bering,[1] however, deals only with a case of koilonychia or spoon-shaped deformity of the nails, together with two cases of subungual papilloma and hyperkeratosis of the nail-bed, respectively. Leviseur[2] also confines himself chiefly to those affections that he has seen; and he claims that in general it is only the presence of characteristic lesions upon other portions of the body that render a positive diagnosis possible. Ringworm of the nails, however, is not so very uncommonly the primary form of the affection, and it is important to recognize its appearance. It begins with a yellowish discoloration of the nail-bed, with hyperkeratosis of that structure, and a loss of the natural glossiness of the superficies of the nail. Usually the upper layers of the nail become brittle and are broken off, and the ungual surface is covered with the rough, inelastic, dirty-brown remains of the nail structure; a condition in which the diagnosis is difficult, but the trichophyton can be readily recognized by microscopic examination. The affection is oftenest seen in elderly people, though whether this is on account of predisposition to infection from senile changes in the nail-bed or because of proneness to fondle dogs and cats, the common sources of the infection, the author cannot say.

Favus of the nails is in general much commoner than ringworm, but almost always occurs in cases where the head is affected. It begins at the free edge of the nail with the appearance of small lacunæ in the nail substance. Both in this affection and in ringworm Leviseur advises avulsion of the nail followed by sublimate compresses. The application of the tincture of iodine is efficacious only in the very mildest cases. Caustics, and the sharp curette are not to be used, since the slightest injury to the matrix causes permanent deformity of the nail.

Eczema of the nails is difficult to differentiate from the other affections of that organ. Deep ulcerations occur from the action of the arsenic in Paris-green workers; they are especially liable to appear in the region of the lunula as dry, black, mummified lesions, and are usually painless. Seal-skin dyers are very liable to have flat, wart-like excrescences around the nails, with a subungual hyperkeratosis; the exact cause is as yet undecided; pyrogallol, aniline black, or peroxide of hydrogen, all of which are employed by these workmen, may any one of them be the noxious agent.

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[1] Munchener medicinische Wochenschrift; Monatshefte f. praktische Dermatologie, June 15, 1904.

[2] Transactions of the American Dermatological Association; Monatshefte f. praktische Dermatologie, June 13, 1904.

For koilonychia or spoon-shaped deformity of the nails, Ohmann-Dumesnil[1] recommends the following: Oleate of tin, 3.75; lanolin, ung. aq. rosæ, āā 15; to be thoroughly rubbed in twice daily. Arsenic should be pushed internally, preferably in the form of the Asiatic pill.

Two cases of pityriasis versicolor of the nails are reported by Campana[2] from the Dermatosyphilitic Clinic of the University of Rome. One of them had general pityriasis of the body. The nails were brittle, but were not hypertrophied, and the characteristic parasite was found in the scales.

There are some nail diseases, however, which it is impossible to classify among the recognized affections, and in which no other structures are involved. This is notably the case with the disease that Heller calls onychorrhexis, a variety of atrophy. The nails become longitudinally fissured, very brittle so that they are constantly being chipped off by ordinary usage, and very tender.

Noma.—In the review of 1902[3] attention was called to the fact that a number of observers had found the diphtheria bacillus, usually in conjunction with streptococci, staphylococci, and other organisms, in typical cases of this disease. Blumer and MacFarlane, on the other hand, considered a thread-like leptothrix that they cultivated the active agent. The later investigations of Sailer and Korsch support the former view; while Trambusti and von Ranke have found still other organisms.

Trambusti[4] has published some further investigations on the subject. In seven new cases he found various organisms. Three times he isolated the micro-organism that he has described before; once he found a pseudodiphtheria bacillus; he always found the yellow and almost always the white pus organism; and in some cases the proteus vulgaris (a non-pathogenic blastomycelium), the yellow sarcina, and others. He now holds that there is no specific organism responsible for the affection, but that the streptococcus is the most important and the most commonly present. Durante[5] agrees with this; he also failed to find any constantly present organism.

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[1] Monatshefte f. praktische Dermatologie, April 13, 1904.

[2] Ibid., March 1, 1904.

[3] PROGRESSIVE MEDICINE, September, 1902, p. 186.

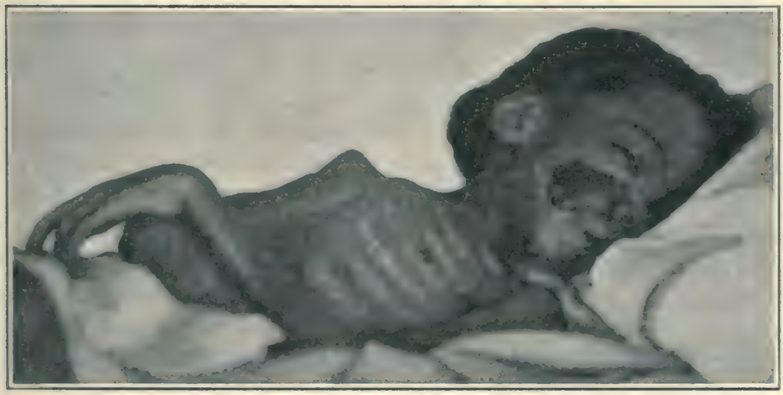
[4] Il Policlinico; Monatshefte f. praktische Dermatologie, May 1, 1903.

[5] Riforma Medica, vol. iii., No. 2.

I append a picture of a case that occurred in the Lebanon Hospital service of Dr. A. Mayer, of this city (Fig. 18). It occurred in a colored child that was brought to the hospital in a practically moribund condition, and lived only two days thereafter. There was no history obtainable save that the child had been treated for an ulcerated tooth for some time previously.

Motschan[1] describes an almost exactly similar case occurring in a boy, aged nine years, in the course of a pneumonia. The treatment consisted in the constant subjection of the affected areas to the light of a 16-candle-power red, incandescent electric lamp, without any other local treatment at all. Pain and odor soon disappeared; the necrotic tissue was cast off, and recovery ensued. Motschan calls attention to the fact that Sokolow in 1900 described a case that was cured by similar treatment. He believes that the red light, while entirely devoid of any direct bactericidal action, gives the tissues increased powers of resistance in some unknown way.

FIG. 18



Noma. (Mayer's case.)

Pemphigus.—With the increase of emigration from Eastern and Southern Europe to this country the severer general dermatoses are undoubtedly seen with greater frequency; and of these pemphigus in its various forms is one. Twenty years ago the disease was very rare; now I see several cases every year, usually in Italians or Russians, and there are always some cases in my City Hospital and Lebanon services.

A number of articles on the subject have appeared during the last year or two. Hoffmann[2] could find no specific microbe in the serum and pus from his case. He summed up his experience of the subject in the statements that the best possible hygiene and tonics were our only means of treatment, and that in spite of it the usual termination was death in from three to seven months. Moos[1] records a case in a child, aged two and one-half years, that ended in recovery under an astringent powder. Hein[2] cured 2 cases with the blue arc light after all other treatment had proved useless; he thinks this method should be looked into.

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[1] Berliner klinisch-therapeutische Wochenschrift, 1904, Nos. 21 and 22.

[2] Dermatologisches Centralblatt, July, 1903.

Two good papers are those of Van Harlingen on "Hysterical Neuroses of the Skin," many of which are pemphigoid in form, and C. J. White on "Recurrent Progressive Bullous Dermatitis;"[3] but in these cases the element of malingering is such an ever-present and misleading factor that they are of but little value in clarifying our ideas of the disease. Frick[4] records a case of two years' standing in which the staphylococcus pyogenes aureus and another typhoid-like organism were found. Secchi[5] also found the staphylococcus aureus in the fluid of the bullæ; he regards the affection as a pure staphylococcus septicæmia. Balser and Fouquet's case[6] was of the hysterical variety. Unna[7] discusses the subject with customary thoroughness; and Fabry[8] describes a case of pemphigus foliaceus, without, however, adding anything especially new to the subject. Eustis[9] has made a series of animal and culture experiments with a case and thinks he has found a characteristic and peculiar diplococcus. This organism is found in the bullous fluid; it causes death in rabbits when injected intravenously; and cultures of a similar diplococcus from the blood of these rabbits caused a pustular eruption, with mild constitutional symptoms, when injected into the veins of a pig. I think that it is safest at present to regard pemphigus as the expression of a general toxæmia caused by the pus organism, without attempting to decide on the exact microbic agent involved.

Pemphigus of the Mucous Membranes.—This is a rare condition, but when it does occur its recognition is a matter of great importance. This was brought home to me very forcibly by a case on my service at Lebanon Hospital last year, and which will be published in detail elsewhere. The patient was sent to me with a diagnosis of syphilis;

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[1] Münchener medicinische Wochenschrift; Monatshefte f. praktische Dermatologie, May 1, 1903.

[2] Die medicinische Wochen.; Monatshefte f. praktische Dermatologie, May 1, 1903.

[3] Journal of Cutaneous Diseases, September, 1903.

[4] Journal of the American Medical Association, May 30, 1903.

[5] Riforma Medica; Journal of the American Medical Association, May 30, 1903.

[6] Bulletin de la Société médicale des hôpitaux de Paris; Annales de dermatologie et de syphiligraphie, December, 1903.

[7] Die Therapie der Gegenwart; Archiv f. Dermatologie und Syphilis, July, 1903.

[8] Archiv f. Dermatologie und Syphilis, June, 1904.

[9] American Medicine, April 16, 1904.

the buccal affection was supposed to be due to the presence of mucous patches. My diagnosis was mercurial stomatitis, and I only gave it up when persistent and long-continued treatment had no effect on the condition. There was a violent stomatitis, of course, and from time to time there appeared peculiar eroded patches on the gums, lips, and tongue. Finally, Dr. W. Cowan, whom I asked to see the case, suggested the possibility of its being a beginning pemphigus. And such it proved to be. The mouth affection was entirely intractable, but it was nearly a year before other bullous lesions began to appear around the finger and toe-nails. Several months after that she developed pemphigus of the body, and ultimately died of sepsis.

In the absence of lesions of the general integument the diagnosis will always be difficult, for neither vesicles nor bullæ appear on the mucosæ, and a very superficial denudation of the epithelium in areas, very similar to that seen in a violent stomatitis of other origin, is the only special symptom. Yet this possibility should be borne in mind when we encounter a very obstinate stomatitis for which there is no ascertainable cause.

Wechselmann,[1] indeed, claims the pemphigus vegetans usually begins in the mouth; and Rosenthal[2] holds that this is the case with the ordinary varieties of the disease also, but it is not recognized, and the dermatologists only see the patients when the malady has involved the general integument. Barlay[3] records a case of pemphigus of the conjunctiva. This is a very rare affection; he only found two cases in 145,927 eye cases seen during twenty-eight years. The other mucosæ, and especially that of the mouth, are usually simultaneously affected. Monfort[4] holds that the mucous membranes are usually affected with the skin, or after it; but records the fact that Mesnard and Dickson have seen it precede the skin eruption by several days. He claims that it is a rather common disease; he sees at least two cases annually, and that the prognosis is good. A case of pemphigus of the œsophagus is noted by Roman-Tameil.[5]

In pemphigus of the general integument there are certainly, from a prognostic point of view, benign and malignant cases; and it may be the same with the affection of the mucosæ. But all the cases that I have seen in which the mucous membranes have been affected have ended fatally, and I should not give any but a very bad prognosis in any such case, either primary or secondary.

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[1] Dermatologisches Centralblatt, July, 1903. [2] Ibid.

[3] Orvosi-Hetilap; Monatshefte f. praktische Dermatologie, May 1, 1903.

[4] Revue hebdomadaire de laryngologie, d'otology, et de rhinologie; Archiv f. Dermatologie und Syphilis, October, 1904.

[5] Monatshefte f. praktische Dermatologie, February 1, 1905.

Pruritus.—To judge by the space that it occupies in the general medical journals, and the number of infallible prescriptions for its relief that appear each year, pruritus is the dermal symptom about which the practitioner is most frequently consulted, and which he most often fails to relieve. In the absence of any very troublesome or disfiguring dermatosis it is certainly the symptom upon which the more ignorant of our patients lay the very greatest stress; they refuse to consider themselves cured, even if all objective signs of disease have disappeared, so long as the least itching remains.

Now the fact of the matter is that with many of the pruriginous dermatoses itching persists for a long time after the disease is cured, and disappears but slowly and gradually. Habit seems to play a large part in this persistence. Bottstein[1] calls attention to the role of tobacco as a causative factor in many of the cases of localized and general pruritus, and as an agent that prolongs the neurosis in many of the itching affections. The French practitioners recognize this fact, and always forbid smoking where the symptom is present. Bottstein records 3 cases, 1 of general pruritus and 2 in which the scrotum and anus and the eyebrows respectively were affected, which disappeared when smoking was stopped and promptly reappeared when it was begun again.

A number of more or less elaborate articles on the subject have appeared during the year. Dickinson[2] very properly lays stress on the importance of treating any general disease, such as anæmia, chlorosis, diabetes, Bright's, etc., that may be present. Tuttle[3] and Hartzell[4] also emphasize this point; the latter tabulates the following internal remedies in the order of their usefulness: Bromides, cannabis indica, fluid extract of jaborandi (13 to 20 drops t. d.), antifebrin, antipyrin, phenacetin, and salol. Bosse[5] claims to have cured a case of pruritus senilis with injections of Pohl's sperminum. Menage[6] believes that he has gotten the best results from cannabis indica, beginning with 3-drop doses well diluted and gradually increasing the amount. Besides this he approves of camphor monobromate, valerian, musk, and castoreum, separately or combined, in pill form and in full doses.

Chief stress, however, is laid on the local treatment by all these authors. Tuttle (*l. c.*), referring more especially to pruritus ani, recommends the following as the two best local applications: Ac. carbolic., 7.3; ac. salicylic., 3.73; glycerin, 30, and fluid extract of hamemalis, 30; fluid extract of ergot, 60; fluid extract of hydrastis, 30; tinct. benzoin comp.,

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[1] Medical Review of Reviews, December 3, 1904.

[2] Detroit Medical Journal, July, 1904.

[3] Monatshefte f. praktische Dermatologie, August 1, 1904.

[4] Ibid., July 13, 1904.

[5] St. Petersburger medicinische Wochenschrift, 1904, No. 7.

[6] New Orleans Medical and Surgical Journal, November, 1904.

7.3; carbolized oil (3 per cent.), 30. He uses chloral (0.6 to 30) when rhagades are present. He also recommends argyrol, 30 per cent., used at first daily and then every second or third day; between times the following ointment is to be employed: Ac. carbolic., 0.2; resorcin, 0.3; ichthyol, 1, and vaselin, 10. Hartzell (*l. c.*) prefers thymol for pruritus senilis, and after that resorcin ½ per cent. or more in sodium chloride solution. Gaucher recommends[1] the following ointment very highly: Hydrogen superperoxid. puriss., lanolinum anhydric., vaselin, talc. pulv., āā 20. Reichmann[2] lauds epicarin in 10 to 15 per cent. salve or solution as an antipruritic. Menage (*l. c.*), in addition to the usual antipruritics carbolic acid, camphor menthol, and chloral, applies galvanism as strong as it can be borne when the itching is confined to localized areas. For the more general cases he uses an electric bath with the sinusoidal current.

Morris[3] treats pruritus ani with anodyne suppositories containing ½ grain of cocaine, or a 4 per cent. cocaine ointment, or a cocaine-glycerin lotion. He very properly warns against using this drug too strong, or for too long a time. He has found a large number of other applications useful in certain cases, such as menthol in strong sodic carbonate solution, oil of cade compresses, balsam of Peru in vaselin, the tars, belladonna suppositories, ichthyol, benzoin, tincture of iodine, gall ointment, black wash, lead-water, etc. The most obstinate cases require caustics, such as nitrate of silver one-half drachm to sweet spirits of nitre one ounce, or the actual cautery. Like the rest of us, he has found the purely neurotic forms less amenable to treatment than any others. The less local treatment done in them the better; constitutional remedies must be our reliance.

Truly, if there was ever an *embaress de richesse* we have it here. There may be wisdom in the multitude of councillors; there is certainly confusion in the multitude of remedies. And I cannot point out any very useful clue to the maze. So long as the real cause of the pruritus is unknown to us, as is but too often the case, our treatment is necessarily symptomatic, and we must try one of the approved remedies after another. I shall even venture to suggest another treatment that has done me good service in a number of cases during the past year, though it has also frequently failed. The high-tension current, applied with a large glass vacuum electrode where the affected areas are extensive, or with an anal or vaginal vacuum electrode for the cavities, has been at least as serviceable to me as any of the local applications. Where the itching is extremely localized I use a small-pointed carbon electrode to spark the spot with the high-tension current. This must be done cautiously, since the effect is cauterant.

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[1] Journal de médicine; Dermatologisches Centralblatt, May 1, 1904.

[2] Monatshefte f. praktische Dermatologie, April 15, 1904.

[3] British Medical Journal; Medical Standard, December, 1904.

Psoriasiform Disease.—This seems to be a more appropriate title for the class of diseases under consideration than psoriasis alone. The boundary line between a true typical psoriasis and many forms of seborrhœa and chronic eczema is so indefinite that cases that equally competent authorities would place in any one of these categories are constantly being met with. This led Unna several years ago to establish eczema seborrhoicum as a disease entity; and it is generally accepted as such by dermatologists to-day. Then came the recognition of psoriasiform eczemas and seborrhœas; until the tendency to-day is to obliterate to a very large degree the boundary lines between these three affections. This has gone so far already that some of the most recent German text-books practically treat psoriasis and eczema as one and the same disease. To a certain extent this is undeniably justified; though, of course, the great majority of the cases are readily placed in one or the other category, and the customary differentiation will be retained. The treatment of the diseases is essentially different; and the mere existence of a large number of mixed and boundary-line cases must not be allowed to affect our broader conceptions of diagnosis and treatment.

Under the heading of psoriasis I noted two years ago[1] two general schemes for the treatment of these cases which were representative of the methods in vogue in Germany and in France, respectively. Though satisfactory in a general way, they differed in some important respects from that in vogue in this country. Thus Chaneil rejects arsenic entirely for internal administration in his scheme, and pins his faith on large doses of the iodide of potash; a mode of treatment from which I have failed to get any positive results at all. He is afraid of chrysarobin when employed over extensive areas of the body, and restricts its use to the smaller lesions. This is by no means in accord with our experience here; I habitually use the drug in any required strength, and over the entire cutaneous surface if required. Morgenstern, on the other hand, rejects internal medication altogether, and relies on external applications alone. I am very sure that in the long run we get better, quicker, and more permanent results from a combined internal and external treatment.

The principles and rules that experience has taught me as regard this disease are as follows:

1. Though psoriasis is a disease that is incurable in the sense that its manifestations will almost certainly reappear, it is always temporarily curable, its relapses may be postponed for long periods, and we can do a very great deal by systematic and careful treatment, both during

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[1] Progressive Medicine, September, 1903, p. 136.

the attacks and the intervals of freedom from lesions, to keep the patient comfortable and fit for work. This latter is a vital consideration in our strenuous American life. A combined internal and external treatment is our best means of attaining these ends.

2. We find the disease affecting two distinct classes of patients. About half of our psoriasis cases occur in persons of good and even robust health, and these require only the specific internal and external treatment for the disease. The other half suffer either from various coincident affections and conditions that are always of influence in keeping up the skin disease, and are sometimes apparently its indirect occasion. Anæmia and chlorosis, rheumatism and gout, malarial infection, neurasthenia and hysteria in their various forms, gastrointestinal affections, etc., must be relieved before our antipsoriatic medication can be expected to have its proper effect. Hygienic measures, rest, change of air and scene, as well as the medication and regulations required for any definite lesions that may be present, are as important for the relief of the affection as the remedies to be recommended below.

3. Since most psoriatics have suffered from their disease for years their experience with the different forms of treatment is often large. Sometimes they think they know more about treatment than does their attendant. Exact rules must be laid down and rigidly adhered to. I refuse to treat these cases on the basis of an occasional visit and imperfect carrying out of instructions.

4. *Internal Treatment.* Iodide of potassium is useless in the great majority of cases; thyroid is useless and even dangerous. Arsenic is the only specific drug. It is best administered hypodermically in daily and gradually increasing doses. I employ by preference a 1 per cent. sterilized solution of sodium arseniate in distilled water, and begin with a dose of from three to five drops, in accordance with the age and size of the patient. I increase the dose daily by one or two drops, and push the medication until the first signs of arsenical saturation are apparent in the respiratory mucosæ; then the medication is kept up in slightly diminished dose. In many cases there seems to be almost no limit to the amount of the drug that can be administered in this way; I not infrequently go up to thirty drops or more. Sodium cacodylate can be used, but it is not so effective as the plain salt. Arsenic by the mouth, as Fowler's solution, arsenious acid tablets, or Asiatic pills is not so effective as the hypodermic medication, is prone to derange the gastrointestinal tract, and is only to be used in the exceptional cases in which the hypodermic administration of the drug is inadmissible.

5. *External Treatment.* This consists, in the first place, of the thorough removal of all crusts and scales from the lesions and the preparation of the diseased surface for the external applications. Benzine, or,

better, carbona, which is non-inflammable, should be employed to remove all fatty matters, and then hot water and green soap and the scrubbing-brush freely, and, if necessary, repeatedly used. The external application, if a solution or an ointment, is then thoroughly rubbed in with a brush; fingers are not efficient for the purpose; the ordinary "stencil" brushes sold in the paint stores are the ones that I usually employ.

Small or isolated patches can be covered with pieces of the 10 per cent. chrysarobin spread plaster or painted with chrysarobin collodion. More extensive areas require ointments; petrolatum is a suitable base. My first choice is tar in the form of the purified oleum rusci, my second is chrysarobin, and the last is pyrogallol. The birch tar is begun at 5 per cent. and rapidly increased in strength as required until it can be used pure. Chrysarobin is begun at 2 per cent., and may be increased to 50 per cent. if needed; when large proportions of the solid medicament are used oil must be used in the base to prevent the application being too dry. Pyrogallol may be used like chrysarobin, but the kidneys must be watched if it is used strong and over extensive surfaces. For the face and head I use only the white precipitate ointment, as a rule, or a mild naphthol-sulphur salve (1 : 500 to 1 : 100). Whatever the preparation used, concentration and vigor of application must be pushed until there is an erythematous reaction in the healthy skin surrounding the lesions. The patches are cured when they show as pale, whitish areas surrounded by stained and rosy skin.

6. The hygienic and general medication should be kept up for a long time after the body has been cleared. The hypodermic medication is stopped; but I always continue the administration of arsenic by the mouth for a month or six weeks longer. These measures are our best guarantee against an early return of the eruption. When that does happen treatment should be begun with vigor at the earliest possible moment.

Herxheimer[1] has lately proposed the employment of zinc peroxide, 10 per cent. in paraffin ointment, together with a varying amount of tar (up to 30 per cent.) as an antipsoriatic treatment. He claims that it is effective, does not discolor the skin or the clothes, does not affect the kidneys, and rarely causes dermal irritation. I have had no experience with the preparation. Dreuw[2] favors a compound formula, with which he has treated hundreds of cases successfully: Salicylic acid, 10; chrysarobin, ol. rusci, āā 20; green soap, vaselin, āā 25 parts. He thus combines the keratolytic, reducing, and peeling with the specific antipsoriatic properties of the drug. I do not like "shot-gun" medication of this order, nor have I found it necessary to have recourse to any of the numerous and less efficient substitutes for the standard drugs—anthrarobin, empyroform and the like. In fact, the success of the local treatment of psoriasis is less a question of drug selection than of careful and efficient employment of the remedy chosen.

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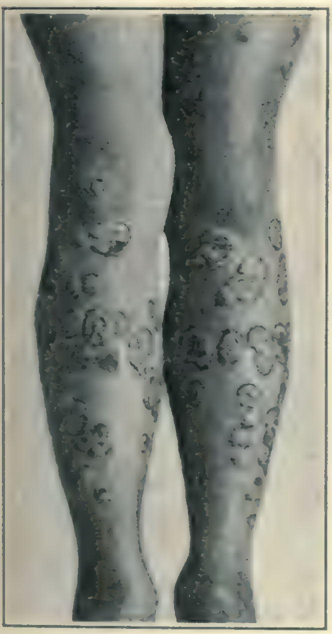
[1] Deutsche medicinische Wochenschrift, 1904, No. 8.

[2] Münchener medicinische Wochenschrift, li., No. 20; Journal of the American Medical Association, July 16, 1904.

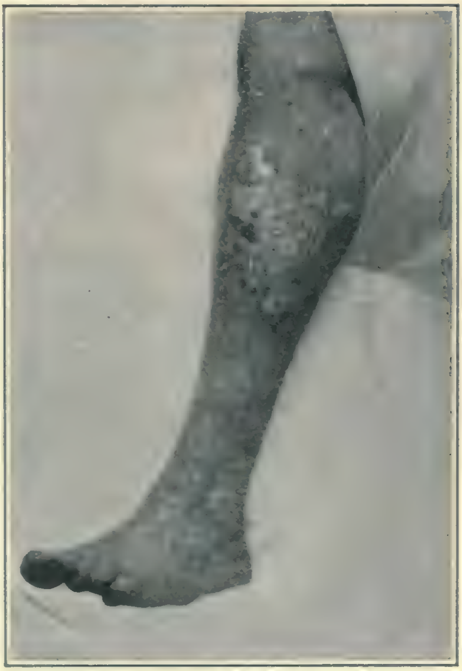
Tuberculosis of the Skin.—Infection of the skin by the tubercle bacilli is shown most frequently, of course, by the appearance of lupus lesions; but the other form of tuberculosis, the chronic inflammatory and keratotic infiltration known as tuberculosis cutis verrucosus, is not uncommon. It is just as hard to cure as lupus itself; and, in my experience, is usually diagnosticated as a keratosis or a chronic eczema, and treated as such for a long time.

FIG. 19



Psoriasis nummulata.

FIG. 20



Psoriasis. (Gottheil's cases.)

Kristan Anderson[1] reports an interesting case of the disease in which there is at least a strong presumption of the direct transfer of the contagion. The patient had a well-marked tuberculosis of the skin on the back of his left middle finger, and marked swelling of the cubical gland of that side.

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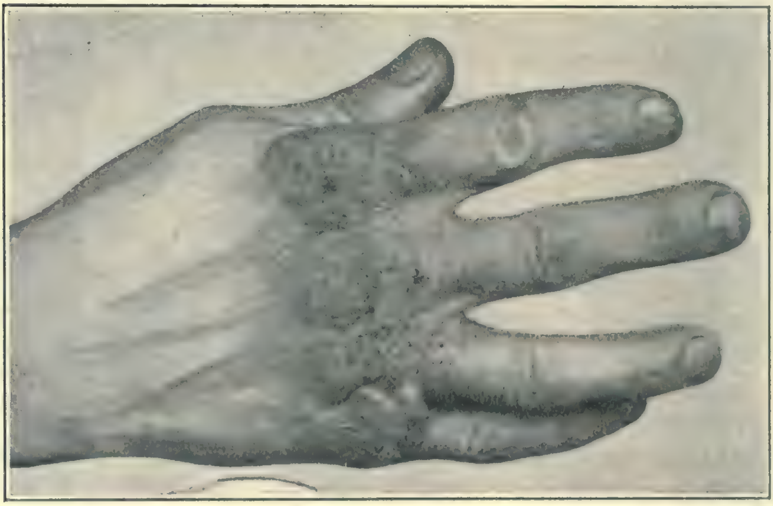
[1] Zeitschrift des Norwegischen Aertztevereins; Dermatologisches Centralblatt, March, 1903.

The only ascertainable source of infection was a tuberculous cow, in the killing and cutting up of which the patient had taken part some time before.

During the last few years a number of cases of tuberculosis of the skin following one of the exanthemata, and most commonly measles, have been reported. The lesions were usually of the disseminated variety. A case of the kind has been recently reported by Gaucher and Druelle,[1] in which there were follicular lesions scattered over the entire body. Adamson's[2] case followed measles, and the author gives a good review of the literature of the affection up to date. Hartzell[3] discusses the various forms of the disease, with especial attention to their treatment. This is essentially similar to that of other tuberculoses; much fresh air, out-door life, and superabundant food, especially of the easily digested kinds, milk, eggs, etc. The local treatment he tabulates as follows:

Fig. 21



Tuberculosis verrucosus cutis. (Dr. J. P. Oberndorfer's case.)

1. *Lupus Vulgaris.* Finsen light and Roentgen rays. The first is most applicable where the extent of the disease is small, as it otherwise takes too long. Radiotherapy is quicker, and, therefore, more suitable

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[1] Annales de Dermatologie, December, 1903.

[2] British Journal of Dermatology, October, 1904.

[3] American Medicine, July 2, 1904.

for larger areas. Excision and transplantation can be used when there is a single area properly located for them.

2. *Tuberculosis Cutis Verrucosus.* The curette, followed by a caustic paste or a strong pyrogallol plaster. If the patient objects to this, radiotherapy may be tried.

3. *Lichen Scrofulosorum.* Cod-liver oil internally and externally. Vaselin inunctions after Crocker are good and unobjectionable.

4. *Ulcerative Scrofuloderms.* Keep aseptic; use stimulating mercurial ointments. Iodoform, europhen, aristol, and other iodine preparations are often useful.

Oberndorfer showed an interesting case of the verrucous variety of tuberculosis cutis at a recent meeting of the Manhattan Dermatological Society, a picture of which is appended (Fig. 21).

SYPHILIS.

Extragenital Chancre.—The fact that the immense majority of chancres occur on the genitals is, of course, due to the thorough inoculation into an abrasion of the surface that is required for the reception of the syphilitic virus. Intimate prolonged contact between two individuals under circumstances likely to occasion lesions occurs, of course, in most cases, only during sexual congress. It is the custom to consider syphilis a venereal disease, and the designation is correct in so far as that it is usually contracted during intercourse. We have learned to appreciate the fact, however, that in a large number of cases infection has nothing to do with it. Apart from its usual mode of origin, syphilis belongs with the chronic infective granulomata. Its morbid anatomy closely resembles that of tuberculosis, lepra, etc., and its semeiology is like that of scarlatina, smallpox, and similar maladies.

Extragenital chancres are so common that they are not worth recording as a rule. Yet in certain locations they are still very rare. Gutzeit[1] notes a case of chancre of the conjunctiva, and has found the records of 21 previous cases. This one was gotten through "licking" the eye for an injury; a disgusting practice still in vogue in certain parts of the world. It appeared as a small, whitish, pea-sized spot, with a hard ridge around it. Brunon[2] encountered a nasal chancre in a boy aged seven years. The first symptom noticed was a papular eruption and mucous patches in the mouth. The child had had a "cold," with a mucosanguineous discharge from the nostrils some weeks before. The initial lesion was found on the left inferior turbinated bone, half an inch from the nasal orifice. Questioning revealed the fact that the boy had the habit of introducing foreign bodies, lead-pencils, penholders, etc., into his nostrils, which he called "playing an elephant."

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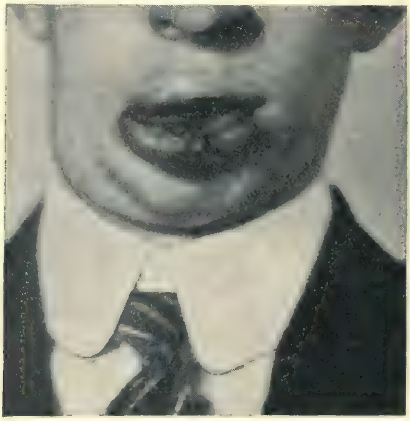
[1] Medical Review of Reviews, July 25, 1904.

[2] La tribune médicale; Medical Bulletin, March, 1904.

It is not unusual for the diagnosis to be missed in these extragenital cases. I can recall many instances of the kind seen by myself and others. Chancre of the finger is mistaken for a simple infection, as in the case I have mentioned. Chancre of the tongue I have seen taken for epithelioma. Chancre of the tonsil has been diagnosed as chronic tonsillitis; in one case under my care tonsillotomy had been done by a very competent laryngologist, and, of course, the operation wound would not heal properly. When I saw the patient four weeks later the site of the excision was still ulcerated, and there was a marked general adenopathy and a beginning macular eruption.

Fig. 22



Chancre of the lip. (Dr. J. P. Oberndorfer's case.)

In one class of cases, however, the difficulties in the way of a correct diagnosis are for a time insuperable. I refer to the so-called herpetiform chancres, where the lesion looks like an ordinary herpes or a herpes that has been infected with pus organisms. In the early stages there is not an amount of induration sufficient to settle the diagnosis, and the submaxillary gland swelling is neither marked nor characteristic. A case of the kind was shown by E. L. Cocks at the Manhattan Dermatological Association on May 5th of this year. It had been under observation for a number of days, and there had been no change under local treatment of what was apparently an ordinary infected herpes group on the lower lip. It was shown as an initial lesion in its earliest stage; but it was the unanimous opinion of all the members that neither its physical characters nor the small concomitant adenopathy justified the diagnosis, and it was not a chancre. Yet on May 23d, eighteen days later, Dr. Cocks sent the patient to me for re-examination. The base of the supposed herpes was indurated so typically and so markedly that it could be recognized visually as a chancre; there was a very large and hard submaxillary adenopathy; there was a characteristic pharyngitis, and a general macular exanthem. The case was a lesson as to the importance of caution in the diagnosis of herpetic lesions, both in the usual situations and on the genitals. I feel that the utmost that we can say in a suspicious case is that it looks like a simple herpes, but it may develop into an initial lesion later on. The herpetic lesions may heal under any treatment, or under none at all, and the induration may develop later. Only the lapse of time can inform us positively whether there has been a syphilitic infection or not. Fortunately the herpetiform chancre is very rare.

I append a photograph of a case of chancre of the lip shown at the same society by J. P. Oberndorfer. Typical cases like this, of course, present no difficulties of diagnosis (Fig. 22).

Intramuscular Syphilotherapy.—The treatment of constitutional syphilis by the hypodermic, or rather the intramuscular, administration of mercury has been strenuously advocated for years past by a gradually increasing number of writers, among whom I may count myself; and it seems that it is at last gaining extended acceptance and bids fair to come into general use. In the discussion of a recent paper on the subject, read by Klotz at the New York Academy of Medicine, almost every speaker advocated the method as the very best at our command. More than this, they expressed themselves in favor of the insoluble mercurial preparations, claiming in many cases that they had used them with the greatest satisfaction for a long time; and the consensus of opinion seemed to be that the salicylate of mercury in albolene, the preparation that I have used for years, was in all respects the most suitable one to employ. I can only add that the experience of the past year has fully confirmed me in the opinions that I have previously expressed. The intramuscular injection of the salicylate of mercury is far and away the best treatment of the disease. It is easy of administration if done properly; it is most efficacious and has few contraindications, and it is taken by the patients themselves not only without repugnance, but with eagerness when its advantages are once explained and appreciated.

The technique of the injections has been considered with some thoroughness in the reviews of the last two years.[1] One important point, however, requires further elucidation, and that is the instrument to be employed for the injections. The ordinary hypodermic syringe is not suitable for the purpose, and most of the difficulties about which I am consulted by those using the treatment are due to its employment.

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[1] Progressive Medicine, September, 1903, p. 177; September, 1904, p. 145.

In the first place it is not convenient to use an instrument that is employed also for the ordinary aqueous injections for the administration of the heavy, oily solution. It necessitates a troublesome cleansing of the instrument with ether after each employment, and if the packing of the plunger is of rubber, leather, or asbestos it is almost impossible to get it thoroughly clean. Then, again, the ordinary syringe is too light for the rapid thrust that is part of the technique of painless injection. The graduations are too coarse to permit of accurate dosage where amounts are to be measured in drops or portions of a drop. All metal instruments are to be absolutely rejected; they are objectionable enough for watery solutions, since the condition of the fluid and the interior of the syringe, as well as the exact amount administered, are hidden; for an oily suspension of a heavy metallic salt, where settling occurs pretty rapidly, they are entirely inappropriate. The ordinary needles will not do; both their calibre and length is insufficient. A fairly large lumen is needed for the easy extrusion of the thick liquid containing the suspended powder, and they must be an inch and a half in length to reach well into the substance of the gluteal muscles. Finally, the needles must be of the slip variety to permit of quick removal and reapplication as recommended during the injection. It is true that I stated in the 1903 review that an ordinary hypodermic could be employed. Additional experience, more especially with the difficulties of others in carrying out the treatment, led me to very positively prefer an instrument especially adapted to the purpose.

Such an one need not be of all metal or all glass. I have mentioned the reason for objecting to the former. The latter in the market are not accurate or minute enough in their graduation, and, in addition to their fragility, are entirely too light. The statement has been made that there should be no metal in contact with the solution in a syringe designed for mercurial injections. This is true for the soluble salts, but not for the insoluble suspension that I recommend. This has absolutely no effect upon metal, no matter how long it remains in contact with it. In fact, the oily fluid acts as an excellent preservative for the metal. The bright and polished surface of the solid piston-rod that is in the syringes that I employ never even become dimmed; and the needles for the same reason last almost indefinitely. There is no oxidation and clogging with rust, as with watery solutions. In point of fact I do not clean the interior of my syringe. The suspension itself is sterile, and there is no chance for contamination between injections, when in the closed syringe the entire lumen is occupied by the solid metal plunger.

I have lately had an instrument constructed for the purpose of making these injections that is in every way suitable for them, and that I have used with great satisfaction for a year past, and have described elsewhere.[1] The barrel is of glass, narrow, and accurately graduated in minims, so that accurate doses in drops and fractions thereof can be readily given. The plunger, a solid metal rod, fits this so accurately that there is practically no space at all between it and the sides of the tube and the end pieces when it is closed. The piston head is large and heavy, so as to give the necessary impact weight; and it is flat, so that the filled instrument can be stood on end, and accidental contamination of the needle avoided. The needles are of the right size, and the slip caps are accurately fitted, so that they act as well as the usual screw arrangement.[2]

Among the many who have advocated the hypodermic as the routine treatment of syphilis during the past year I may mention Wickham,[3] Fuller,[4] Trémolières,[5] Bréton,[6] Emery and Druelle,[7] Barthélemy,[8] Ledermann,[9] Levy-Bing,[10] and Grosz.[11] A minority of the writers still use the soluble mercurials; but the trend is entirely toward the employment of the insoluble suspensions. Laborie[12] advocates the mercurial of Blonquist, claiming that it acts quicker even than gray oil. Colloidal mercury has been used by some experimentors, but Barthélemy, Lafay, and Levy-Bing,[13] reporting on it, state that they have used it in 12 cases, making 160 injections, and that they do not like it. They used a solution of 0.10 cgm. in 10 c.c. of distilled water, of which 1 to 2 cgm. was the amount required daily.

They found that there was often diarrhœa and stomatitis; that indurations were frequent; that there was always pain for several hours after the injections; and that the therapeutic effects were inconstant and insufficient.

Waelsch[14] has tried *Paulsen's serum* in guinea-pigs, and found it toxic; he mentions the fact that Appel and himself had treated 14 human cases with it without harm, but with results that, to say the east, were doubtful.

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[1] International Clinics, vol. iii., fourteenth series.

[2] Obtainable from C. Spindler, 157 East Seventy-second Street, New York City.

[3] Practitioner, London, July, 1904; Journal of the American Medical Association, August 20, 1904.

[4] Monatshefte f. praktische Dermatologie, June 1, 1904

[5] Presse médicale, 1903, No. 24; Monatshefte f. praktische Dermatologie, June 1, 1904.

[6] Journal des praticiens, 1903, No. 45.

[7] Presse médicale, 1904, No. 12.

[8] La Syphilis, February, 1904.

[9] Deutsche medicinische Presse, 1904, No. 17.

[10] Les injections mercurielles intramusculaires dans la syphilis; Naud, Paris, 1903

[11] Archiv f. Dermatologie und Syphilis, October, 1904.

[12] Journal des maladies cutanées et syphilitiques, January, 1904.

[13] La syphilis, February, 1904.

[14] Archiv f. Dermatologie und Syphilis, July, 1904.

Lane[1] has also used the serum, but has had no special result from it except when combined with other and recognized antisyphilitic treatment. This result, or rather this want of them, is of interest in view of the energy with which an antisyphilitic serum is being pushed in this city (New York). What little I know of it has not led me to have any confidence at all in it.

Since the injections correctly given are almost painless, the only legitimate objection to them is the possibility of the occurrence of embolism from the injection of the oily suspension directly into the venous circulation. Personally, I know nothing about this accident; I have never encountered it. I have no exact figures at hand as to the number of injections that I and my assistants and the staff of the City and Lebanon Hospitals give in the course of the year; but it must be between 1500 and 2000 annually. I attribute this safety entirely to the precaution, which will bear repetition here, of disconnecting the needle from the syringe after the puncture, and watching the lumen of the needle before completing the injection. I have said in a publication made some time ago that it had hardly ever happened to me to engage the orifice of the needle in the lumen of a vein. I have had the experience, however, a number of times during the past year; and I have always immediately withdrawn the needle, made a new puncture, and made the injection in another spot.

I am not aware whether Voss,[2] who has made a study of this complication, adopts any similar precaution; but he has shown conclusively that when embolism does occur as a consequence of the salicylate injections it is a harmless complication. He found the symptoms invariably slight and transient. He observed it, it may be noted, only 13 times in 13,671 injections given in 1373 patients; once in 1000 injections. Isolated cases have been reported in which the symptoms, pain, dyspnœa, cough, bloody expectoration, etc., have been severe; but in almost every instance they passed off rapidly and prompt recovery ensued.

Postmortem Signs of Heredosyphilis.—This subject is of some practical importance. The determination of the cause of a miscarriage or of an infantile death may be necessary for the treatment of the mother and the prevention of the recurrence of the accident.

A very excellent *résumé* of the postmortem signs of the syphilitic infection is given by Helker;[3] they may be classified as follows:

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[1] Practitioner, London, July, 1904.

[2] Dermatologische Zeitschrift; Journal of the American Medical Association, January 7, 1905.

[3] Monatshefte f. praktische Dermatologie, October 1, 1904.

I. *Macroscopic Signs.*

- A. *Positive signs* (one suffices).
  1. Marked osteochondritis of the second grade (irregular (cartilage-bone junction at the lower femoral epiphysis, enlargement of the cartilaginous calcification zone).
  2. Marked increase of weight and hardening of either the spleen or the liver. The liver must be characteristically discolored and of increased elastic resistance.
  3. Cirrhotic processes in lungs or liver.
  4. Marked white pneumonia.
  5. Papular or vesicular syphilides.
- B. *Probable signs* (two needed for diagnosis).
  1. Osteochondritis of the first grade.
  2. Marked increase and hardening of the liver, spleen or kidneys.
  3. Gummata (to be distinguished from tubercles and spots of decomposition).
  4. Thymus abscesses.
  5. Not marked white or interstitial pneumonic processes.
  6. Hardening of the pancreas.
  7. Macular syphilide (fades mostly; to be distinguished from decomposition spots).
  8. Papular, vesicular, and pustular syphilides altered by maceration.
- C. *Uncertain signs* (if these only are present, the microscope is necessary for diagnosis).
  1. All the probable signs when not well marked or obscured by maceration.
  2. Erythemas.
  3. Circumscribed thickenings of the intestinal wall.
  4. Multiple hemorrhages.
  5. Ascites.

  Less than normal size and weight. (All these uncertain signs may occur in the nonsyphilitic subject.)

II. *Microscopic Signs.*

1. Kidneys. Vascular changes, especially a cellular infiltration of the walls of the smallest cortical arteries and their neighborhood, is pathognomonic of syphilis. It is hardly ever absent; if present, no further search is needed.
2. Kidneys. Connective-tissue changes, diffuse infiltrations, interstitial inflammations, cirrhoses, circumscribed infiltrations and gummata. These are pathognomonic, but they are not often seen in fœti and infants.

3. Kidneys. Epithelial changes. Very rarely seen in fœti.
4. Developmental changes.
    - (*a*) Increased development (epithelial proliferation).
    - (*b*) Hindered development (lessening of number of the glomeruli, presence of pseudoglomeruli, even at birth; growing of "neogenetic" tissue beams into the parenchyma.
    - (*c*) Broadening of the mesenchyme.
    - (*d*) Developmental disturbance of the epithelium of the tubules and the glomeruli.

      (These developmental changes are not especially useful practically, since they are not universally accepted.)
5. Spleen. Cellular infiltration of the walls of the medium and larger vessels.
6. Thymus. Interstitial inflammation with secondary shrinkage.
7. Pancreas. Interstitial inflammation.
8. Liver. When there are marked interstitial inflammatory changes, arteritic processes, or undoubted gummata, the diagnosis is not difficult. It may be hard to make, however, in cases in which disease is not marked.
9. Lungs. Diagnosis difficult in early cases; easy when there are marked white or interstitial pneumonic processes.

I regard the points of macroscopic diagnosis as by far the most useful, since neither the time nor the facilities for extended microscopic examinations are available in the great majority of cases. The list may prove useful in helping to come to a decision in doubtful cases.

Syphilis in the Newborn.—The syphilitic infant may be born apparently healthy; but the first signs of the disease are usually manifested during the first three or four weeks of extrauterine life. Exceptionally they may be postponed until the third or fourth month; and they always appear before the sixth. Cases of heredosyphilis in which there are said to have been no symptoms until much later are instances in which the less marked manifestations of the disease have not been recognized. If more attention were paid to these slighter signs of the inherited disease the appropriate treatment would be instituted earlier and we should have less of the severe and fatal cases than we do.

Leaving out of account considerations of the symptoms in the parents or their past history, the birth of an imperfectly developed child, under weight, with little hair and undeveloped nails, should at least awake suspicion. There is often a peculiar brownish discoloration of the skin, especially of the face, as was first noticed by Trousseau and Henoch. The integument is more or less wrinkled from the paucity of subcutaneous fat, and the countenance is peculiarly weazened, and looks like that of an old man. When an infant of this appearance develops a persistent coryza our suspicions of syphilis become strong.

We are all more or less familiar with the various eruptions of the macular, papular, and bullous forms that mark the hereditary disease; less so perhaps with the diffuse infiltration and reddening of the palms and soles that occur. The skin in these locations is crimson, swollen, smooth, and glistening, and present an appearance so characteristic that the diagnosis can be made on that alone. Moist papules around the mucous orifices, mucous patches, etc., are characteristic signs. The liver and spleen may be enlarged; digestive disturbances soon set in, and the infant begins to fail.

A less common set of symptoms of lues in the newborn is the occurrence of a hemorrhagic eruption, possible in conjunction with hemorrhages from the internal organs. Isham[1] records such a case, which is precisely similar to the one of my own mentioned below. The child, born apparently healthy, had a most obstinate navel hemorrhage on the twelfth day, followed by extensive blood extravasation under various parts of the skin. Cure was rapid under mercurial treatment. Wilson[2] records not less than 10 cases that have come to the autopsy table. There were hemorrhages of various internal organs, together, in most cases, with other symptoms of heredosyphilis.

In the case that I have recorded[3] the child was born apparently healthy save for a large nævoid tumor in the skin of the left lumbar region, and several similar but smaller ones on other parts. From these there occurred during the second week of life a causeless, most violent and uncontrollable hemorrhage, which continued until death. Neither styptics, compression, nor the actual cautery would control it. At the same time there occurred an eruption of hemorrhagic vesicles all over the body, including the palms. They looked exactly like varicella vesicles, save for their hemorrhagic contents. There occurred hemorrhages from the stomach and bowels, and finally there was blood in the urine. The child died at the sixth week.

Birrenbach[4] calls attention to the importance of *micromelia* in the diagnosis of hereditary syphilis. There is a stoppage of growth in the cartilage-bone zones, followed by fibroid degeneration. Thus we get large epiphyseal cartilages and shortened diaphyseal bones. Hutinel[5] calls attention to the syphilitic ulceration of the umbilicus as a reliable sign of the disease. At his service at the Hôspice des Enfants-Assistés about 4000 newborn infants are brought yearly; and the grave question must be quickly decided in each case, and with little or no knowledge of the parents, whether or not the child is syphilitic. The results of error, he says, are serious; for if a luetic child is put out to nurse, the foster-mother and her family may contract the disease; while if a healthy child is sent to the nursery to be bottle-fed, it is almost sure to die from gastrointestinal disturbance before long. The ulceration of the navel that he describes appears as a lardaceous infiltration and develops into a true gumma, which finally breaks down. It can be distinguished from the commoner infective inflammation of the navel by the absence of pain, tenderness, or any constitutional symptoms.

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[1] Cincinnati Lancet-Clinic; Dermatologisches Centralblatt, May, 1904.

[2] Journal of the American Medical Association, February 11, 1905.

[3] Archives of Pediatrics, June, 1898.

[4] Inaugural Dissertation, Griefswald; Archiv f. Dermatologie und Syphilis, April, 1904.

[5] La syphilis, vol. i., No. 2; Journal of Cutaneous Diseases, June, 1904.

Professionally Acquired Syphilis.—Far more frequently than is commonly supposed the physician is accidentally inoculated with the specific virus in the course of his professional work. Blaschko,[1] in a recent article, goes so far as to call it a "berufskrankheit," a professional disease of doctors. The risk of contagion is constant, more especially for the gynecologists and obstetricians, and only to a slightly less degree for those engaged in genitourinary work. The profession in general does not hear much of these cases; but syphilographers see a number of them.

Unfortunately, it is the rule rather than the exception for the diagnosis not to be made early. The chancre on the finger is usually considered a simple infection, or even a tuberculosis, and is neglected or mistreated under that supposition. In a case that has been under my care for the last two years the surgeon who had the case at first used all kinds of local applications, incised, curetted, and finally proposed amputation of the terminal phalanx of the patient's index finger. Luckily, the patient himself began to think that his cephalalgia and general symptoms were too severe for a simple mild infection; his suspicions were aroused, and when he came to me both his skin and his mucosæ showed indubitable evidences of the disease. In fact, I have come to a point at which I regard any chronic, obstinate, more or less painless lesion on the hand of a physician with suspicion.

It seems to be a fact that infection may occur without any ascertainable point of entrance of the virus. With ordinary patients this is a matter of not very infrequent occurrence; but, of course, we can never entirely exclude the element of deception. But that it should occur in the person of trained observers with every interest opposed to deception would tend to make us believe in the occurrence of the French "syphilis d'emblée," syphilis without a primary lesion. Blaschko relates a case in point, in which a general roseola was the first symptom of the disease, without any point of entrance of the virus being discoverable. He says the patient was a very careful, painstaking, and conscientious physician. I have very recently had a similar case. This physician consulted me for a perfectly unmistakable tertiary circinate syphiloderm of the neck; he had also distinct symptoms of tabes. He was a skilled observer, and had been constantly on the lookout for an infection which his work exposed him to, and which he dreaded. Yet at no time in the past had he ever had a suspicious lesion of any kind on the skin or mucosæ. In one of Blaschko's cases infection was unmistakably derived from the dissection of a syphilitic subject twenty-four hours after death.

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[1] Berliner klin. Wochenschrift, December 26, 1904.

There seems to be some ground also for the supposition that syphilis in physicians is not infrequently of exceptional obstinacy and severity. This may be due to the fact that, strange as it seems, they but too often lead unhygienic lives which they would not permit patients under their care to do; they often habitually overwork themselves, and deny themselves proper exercise and recreation. Perhaps, also, their very familiarity with the disease leads them to minimize its dangerous possibilities. But the most important factor, in my estimation, is the fact that their treatment is usually imperfect and insufficient. I am loath to say it, but I know of no more unsatisfactory class of patients to treat for this disease. They seek and follow imperfectly a multiplicity of advice, sometimes divergent; they often follow their own rather than their attendant's judgments and they are too busy to attend to themselves as soon as urgent symptoms have been relieved. I can instance two pregnant and recent examples. In the first there has been an iritis of a most exceptionally obstinate nature, persisting in greater or lesser degree for two years in spite of all the measures that a well-known ophthalmologist and I together could employ. Yet the patient has not been able to take the vacation that he urgently needs, even in summer; and he must continue his nightwork, keep up his reading, as far as possible, etc. In the other case the patient himself decides how often he shall come for the injections and what the dose shall be. It has happened to me more than once that, much as I dislike to do so, I have been compelled to relinquish the treatment of such cases.

Now, as regards the avoidance of accidental infection, which, after all, is the chief thing. I see a great deal of syphilis in public and private practice; in the former I systematically refuse to make any digital examination at all unless I am perfectly sure that my hands are free from the slightest crack, fissure, or hang-nail, etc. An assistant whose hands are entirely whole examines if I cannot. In private practice I always use finger-cots; they are cheap enough to be thrown away after use on a suspicious case. I think this is much better than relying on collodion, or 2 per cent. nitrate of silver. If, after an examination, I find a lesion that I was unaware of, I thoroughly apply pure carbolic acid on a toothpick into its depths, and if the case has been an unmistakably contagious one I use nitric acid in the same way.

The infected physician's professional work need not be abandoned, save, of course, the manual part of it when there are lesions on the hands. As Blaschko says, the physician's family life suffers more than does his professional; but our profession, he adds, frequently requires great sacrifices from its members; and experience has shown that they are borne with courage and dignity even under these circumstances.

DISEASES OF THE NERVOUS SYSTEM.

By WILLIAM G. SPILLER, M.D.

DISEASES OF THE BRAIN.

Tumors of the Brain. Localizing Signs. The paper by James Collier on the false localizing signs of intracranial tumors is exceedingly interesting and important. He shows how apparently localizing signs occurring late are of little diagnostic value. In one case in which a glioma of the left prefrontal region was found, the patient had had late signs suggestive of a tumor in the posterior cranial fossa, viz., complete nerve deafness of the left ear, paralysis of the left external rectus, and left peripheral facial paralysis. In another case in which a cerebellar tumor was found, Jacksonian epilepsy developed late. False localizing signs were present in 20 cases out of the 161 cases studied. In two cases the false localizing signs were caused by vascular lesions (hemorrhage, thrombosis), situated at a distance from the growth. In the other cases the false signs were attributable to the indirect results of intracranial tumors. They were met with in 13 per cent. of the supratentorial tumors and only twice among 54 cases of subtentorial tumors. Paralysis of cranial nerves occurring late is supposed by Collier to be caused by the shifting backward of the brain stem from the supratentorial pressure. The paralysis of the sixth nerve is more common as an indirect result of intracranial tumor than paralysis of any other cranial nerve. The sixth nerves are directed straight forward; the shifting backward of the brain is supposed to cause much traction upon these nerves and only a little on nerves that are directed transversely. Collier finds slight weakness of the lower part of the face very common when there is a supratentorial tumor in any situation. Palsy of the cranial nerves is not of common occurrence as an indirect result of intracranial tumor. It was present in 16 of the 161 cases, or 10 per cent.

Collier[1] believes that the occurrence of Jacksonian epilepsy long after the general signs of intracranial growth have appeared is to be disregarded as of localizing value, as it may be caused by hydrocephalus. The most common cause of Jacksonian epilepsy, he believes, is idiopathic epilepsy. Bilateral spastic paresis occurring in the late stages of intracranial tumor he attributes to cortical wasting, resulting from secondary distention of the ventricles. If it occurs early it usually indicates that the tumor is in a region where the pyramidal tracts are close together. The combination of bilateral spastic paresis with cranial-nerve palsies, usually a sign of implication of the brain stem, may be produced in the late stages of a growth in any situation within the skull.

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[1] Brain, Winter, 1904, vol. xxvii. p. 490.

The unreliability of what appear to be localizing symptoms in brain tumor is shown in a case reported by Souques.[1] Hyperæsthesia in the area of the left trigeminus and bilateral deafness, with other symptoms of tumor, suggested the base of the brain as the seat of the lesion. The tumor was found at the necropsy in the left frontal lobe, but a correct diagnosis during the life of the patient seems to have been impossible. The bilateral deafness is especially worthy of note. Souques believes that cerebral tumors, especially when they develop rapidly, may cause alteration of the internal ear by action at distance. The deafness is caused by increase in the pressure of the cerebrospinal fluid, and resembles the blindness resulting from papillitis occurring with brain tumor. Deafness seems to be uncommon in cases of brain tumor, but Souques suggests that it may be more common than we suppose. The examination of the internal ear is difficult and is rarely made in these cases, and deafness is not so readily observed by the patient as blindness.

TRAUMA AS A CAUSE OF TUMOR. The interesting feature in a case of brain tumor reported by Liefmann[2] is the relation of head injury to tumor. The patient received a severe wound in the head in the right parietal region. About eight months after the injury the general symptoms of brain tumor began to be manifest, and about a year after the appearance of these symptoms an operation was performed, and a sarcoma was found exactly under the scar. A causal relation of the injury to the tumor formation in this case seems to be clearly demonstrated.

TUMOR SYMPTOMS CAUSED BY OTHER CONDITIONS. In an exceedingly important paper Nonne[3] shows how the symptoms of brain tumor may be present in a case in so marked degree that one could hardly doubt the existence of tumor, and yet the patients recover and remain well. Evidently, therefore, some other lesion must have caused the symptoms. He reports a number of remarkable clinical cases in support of his statements. The diagnosis of syphilis is convenient, but not supported by facts; neither can these cases be regarded as manifestations of hysteria or epilepsy, or of intoxication or infection. In the 2 cases of this character with necropsy described by Nonne, the findings did not explain the symptoms; in a third case anæmia seemed possibly to be the cause. The symptoms may indicate a tumor of the cerebrum or cerebellum and may or may not be influenced by mercury, and are probably not caused by hydrocephalus. Nonne compares these cases to those of hemiplegia without organic findings reported by Jacobson and others. The subject, of course, has great importance and teaches that the diagnosis of brain tumor should be made guardedly.

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[1] Revue neurologique, July 30, 1904, p. 727.

[2] Berliner klin. Wochenschrift, September 5, 1904, No. 36, p. 949.

[3] Deutsche Zeitschrift für Nervenheilkunde, Nos. 3 and 4, vol. xxvii. p. 169.

TUMOR AND CEREBRAL SYPHILIS. In a report of two cases of cerebral syphilis Mills[1] shows how closely this disease may resemble brain tumor. He remarks that if the signs and symptoms of encephalic disease can be referred to a single location in the brain, the chances are against cerebral syphilis, although this rule is not without exceptions. He also points out that a large tumor of one cerebral hemisphere, not reaching to the base, may cause signs of involvement of cranial nerves, probably by pressure, and in this way cause symptoms of multiple lesions as in syphilis. As a rule, the symptoms of brain tumor develop more slowly than do those of syphilis. Mills also refers to the great difficulty in distinguishing clinically between multiple sarcomatosis and syphilis.

PNEUMATOCELE OR AIR TUMOR of the cranium is very rare, as L. L. McArthur[2] states. He has collected the reports of 33 cases in the literature; 23 of these were occipital, 10 frontal. McArthur adds 1 more case to the list. The condition should not to be confused with emphysema of the scalp, as it differs from this in being one air-containing sac; emphysema consisting of numerous finely divided bubbles of air in cellular tissue. These tumors, according to McArthur, have for their external wall the skin and periosteum and all tissue between. They vary in size according to their age; they may be as large as a hazel-nut or sufficient to give the head a circumference of two and a half feet. They are of irregular shape, because of the varying degree of attachment of the periosteum to the bone. The irregularity is chiefly determined by the stronger attachment of the periosteum at the sutures. The tissues covering these tumors are of normal appearance if complications are absent. The tumors are not usually sensitive when palpated and give a sense of extreme elasticity or of exaggerated fluctuation. They do not pulsate, but may diminish in size when pressure is applied. The patient frequently hears a sound as of rushing air or water in the ear when the tumor is occipital, and in the nose or throat when frontal. There may be so much fluctuation as to give the impression of a fluid collection, but the finding of a bony outgrowth or ridge at the line of junction of the tumor with the normal scalp will prevent this error. Where the tumor can be partially reduced by pressure, numerous bony irregularities may be felt within it. Efforts on the part of the patient to inflate the middle ear or the use of the Politzer bag will usually restore the tumor to its former size. The tumors are formed by a connection with air-containing sinuses.

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[1] University of Pennsylvania Medical Bulletin, May, 1904.

[2] Journal of the American Medical Association, May 6, 1905, p. 1418.

Auscultation is negative. Percussion offers the most important diagnostic sign, as it gives a highly exaggerated tympanitic note. The causes are trauma and suddenly increased pressure within the buccal and oral cavities. In 16 of the cases, about 50 per cent., the tumor has occurred spontaneously, so far as history of injury or of inflammatory conditions go.

The majority of these tumors were observed in the preantiseptic era. Compression has given temporary success, but recurrences have been frequent, and the compression is painful. Even when aspiration was first done the results were much the same. Opening and packing the cavity have caused suppuration, but since the era of antiseptic surgery this danger has been greatly lessened, and this seems to be the means of treatment preferred by McArthur.

CEREBELLAR TUMOR. It is sometimes impossible to decide on which side of the cerebellum a tumor is present, even after we feel reasonably sure that a tumor is in the cerebellum. Mann[1] thinks that when hemiataxia exists, without disturbance of sensation, the tumor is in the cerebellar lobe on the side of the ataxia. In a case which he has reported recently the sign failed to the extent that the tumor was in the occipital lobe, but on the same side as the ataxia. Mann thinks pressure of the tumor upon the cerebellum caused the hemiataxia. The Babinski sign was present on the same side as the ataxia, the left, although the tumor was in the left occipital lobe. This was evidently a case in which the Babinski sign was unreliable. It may be well to wait for further observation before we accept unconditionally the statement that hemiataxia without sensory symptoms indicate that a tumor is to be found in the cerebellar lobe on the same side as the ataxia.

Oppenheim[2] believes that an important sign of cerebellar tumor is a loss of the corneal and conjunctival reflex, with or without anæsthesia of these parts on the side of the tumor. Sensation in the remainder of the trigeminus territory may be normal. Careful study should be directed toward the reliability of this sign.

A very valuable series of papers regarding cerebellar tumors has recently been published. In the paper by C. K. Mills,[3] the headache, nausea and vomiting, optic neuritis, vertigo, nystagmus, paresis or paralysis, the position of the head, hemiasynergia, ataxia, tremor, etc., are discussed. It is difficult to do justice to this series of papers in the space at our command, and it may be better to allow the reader to refer to the original papers, as they are published in a journal accessible to all. Dr. Mills reports a number of important cases of cerebellar tumor with operation.

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[1] Monatsschrift für Psychiatrie und Neurologie, June, 1904, p. 409.

[2] Berliner klin. Wochenschrift, April 10, 1905, p. 448.

[3] New York Medical Journal, February 11 and 18, 1905.

C. H. Frazier discusses cerebellar tumors from the surgical side, and this paper will probably be mentioned elsewhere in PROGRESSIVE MEDICINE; as will, doubtless, the excellent paper by G. E. de Schweinitz on the ocular signs of cerebellar tumor.

The varieties of cerebellar tumor are discussed from a pathological aspect by T. H. Weisenburg.

TUMOR OF THE MEDULLA OBLONGATA. It is well known that a glioma of the medulla oblongata may cause symptoms much less severe than might be expected from a tumor in so vital a part of the nervous system. A case of intramedullary tumor of this region, reported by v. Rad,[1] resembles, in its clinical features, one of extramedullary tumor of the same region reported by me a year or two ago. In v. Rad's case the first symptom was pain in the back of the neck, which soon became severe. Paralysis of the right upper limb, beginning in the shoulder, developed, and this was followed in about seven months by paralysis of the right lower limb. In about three-quarters of a year after the right upper limb became paralyzed the left upper limb became paralyzed, the weakness first being manifest in the shoulder; five months later the left lower limb was implicated. Pain and temperature sensations were diminished in the left limbs, and touch and sense of position on the right side. The disturbance of motion was more pronounced in the right side. During the few weeks preceding death epileptic attacks, dysphagia, and dyspnœa developed. The medulla oblongata was found much enlarged by a glioma.

It seems remarkable that this progressive paralysis of the limbs, first of an upper and then of a lower limb, could be caused by a tumor within the medulla oblongata, and yet it unquestionably was so caused in v. Rad's case.

Cerebrospinal Rhinorrhœa. Schwab and Green[2] report a case of cerebrospinal rhinorrhœa with retinal changes, and refer to the fact that St. Clair Thomson, in 1899, collected the records of 20 cases in which a watery flow from the nostril could with reasonable certainty be regarded as originating from the cranial cavity. Thomson added the report of a case of his own. Some of the cases have been accompanied by optic neuritis or optic atrophy. The case that Schwab and Green have studied differed from all others in the preservation of a high and almost equal degree of visual acuity in both eyes, despite indubitable evidence of inflammatory and atrophic changes in both optic disks. The type of optic neuritis with cerebrospinal rhinorrhœa is usually severe and destructive of sight, but a milder form may occur. The optic nerve changes are an integral part of the symptom-complex. The nasal discharge may be recognized as cerebrospinal fluid, according to Halliburton, when it is constant and long continued, is perfectly clear, free from taste, smell, and sediment; when albumin and mucin are absent from it, and when Fehling's solution is reduced by it. The etiology of this affection is unknown, and it is uncertain whether it is the result of inflammation or of some anatomical defect. The ocular changes, according to Schwab and Green, seem to indicate that there must in these cases be some process of an inflammatory or circulatory character, which first appears in the optic nerve and then causes the release of cerebrospinal fluid through the nose.

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[1] Deutsche Zeitschrift für Nervenheilkunde, No. 3, vol. xxvi, p. 293.

[2] American Journal of the Medical Sciences, May, 1905, p. 774.

Encephalitis. Southard and Sims[1] have observed hemiplegia in a boy convalescing from *scarlet fever*. Hemorrhagic encephalitis of the parietal lobes was found.

PERTUSSIS AS A CAUSE OF ENCEPHALITIS. Almost any of the infectious diseases may occasionally cause serious alteration of the nervous system, and this is equally true of pertussis. J. H. W. Rhein[2] has collected a large amount of literature bearing on the subject, and has reported the following interesting and important case: A child, aged twenty-one months, developed during an attack of pertussis a spastic diplegia, with later imbecility and general convulsions, and died at the end of seventeen months. The brain and spinal cord showed numerous microscopic hemorrhages, distention of the perivascular spaces, and cellular infiltration about the vessels and within the cortex of the paracentral lobule. The pia was thickened in places and infiltrated with cells, and the pyramidal tracts showed degeneration. The condition was hemorrhagic meningoencephalitis.

Polioencephalitis Superior. An interesting case of ocular palsy is reported by Siemerling.[3] A woman, aged fifty-five years, who had contracted the morphine habit, presented complete right external ophthalmoplegia with ptosis; also limitation of movement in the muscles innervated by the left oculomotor nerve, especially of upward movement, and to a less extent of inward and downward movement. Outward movement on the left side was good. Ptosis of moderate degree was present on the left side. The eye-grounds were normal. The pupils reacted slightly and were contracted because of the morphine. These ocular defects had existed since the patient was three years old, and other symptoms were said to have been absent. The oculomotor and trochlear nuclei were much degenerated and their places were occupied by what appeared to be the remains of an old hemorrhage. The trochlear nucleus on the right side was entirely destroyed, and on the left side a mere trace of it was found. The oculomotor nucleus on the right side was almost destroyed, merely a portion of the proximal end persisting. The left oculomotor nucleus was much implicated. The right intramedullary portions of the oculomotor fibres were much degenerated; the left were a little better preserved. The cause of the hemorrhage was difficult to determine, as it had developed without trauma and without symptoms of intoxication or infection. The early age was contrary to a diagnosis of vascular disease. There was no reason to suspect syphilis or tuberculosis. The lesions were not unlike those occurring in acute anterior poliomyelitis, and Siemerling seems to incline to this diagnosis, although he does not express a positive opinion.

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[1] Journal of the American Medical Association, September 17, 1904, p. 789.

[2] Ibid., March 4, 1905, p. 697.

[3] Archiv für Psychiatrie, No. 1, vol. xl. p. 41.

Aphasia. Congenital word-blindness is a condition that probably is more common than the number of reported cases indicates—viz., 14 reported by six authors. Sydney Stephenson[1] has recently added 2 more to the list. There is probably, as he says, a congenital condition not necessarily associated with any other defect, mental or physical, in which the learning of letters or of words from printed or written characters is difficult or impossible. The condition may be caused by a congenital defect in the visual memory centre for letters and words. Most of the cases have been in males. The auditory memory usually has been highly developed. One of Wernicke's patients could speak two languages correctly. In some of these cases much improvement may be expected, but this will depend on early and proper training, hence the defect should be recognized so soon as possible.

C. K. Mills,[2] in a recent paper, returns to the subject of aphasia upon which he has written so often and so well. The island of Reil is, according to his views, an important part of the zone of speech, but probably only its anterior portion constitutes conjointly with Broca's area the centre of motor speech. He refers to two recent cases which he regards as affording evidence of the existence of a graphic centre, and to a case reported by him in 1889 in which paralysis was limited to the tongue, lips, and lower face, with slight implication of the palpebral orbicular muscle of the same side. Speech was entirely unaffected, except as regards the effect on articulation caused by the lingual, oral, and slight facial paresis. The necropsy showed cortical softening involving the lower extremities of the central convolutions. The case seems to indicate that the true speech centre is confined to the subfrontal convolution and a part of the insula and does not extend into the lower part of the precentral convolution.

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[1] Lancet, September 17, 1904, p. 827.

[2] American Journal of the Medical Sciences, September, 1904; University of Pennsylvania Medical Bulletin, May, 1904; Proceedings of the Philadelphia County Medical Society, September 30, 1904.

Mind Blindness. The case of mind blindness reported by Ward A. Holden[1] seems to be unique, because the patient had for a long period a form of mind blindness, and yet no lesion was found on the mesial surfaces of the occipital lobes or in the optic radiations, as is the rule in these cases. Symmetrical areas of softening were present in the outer cortex of each cerebral hemisphere, including on each side the angular and supramarginal gyri. Clinically, the case was one of dementia after hemiplegia, with aphasia, apraxia, and an interference with vision, which much of the time amounted evidently to total blindness. When the man walked his wife always led him, because of muscular weakness, and, therefore, it was difficult for her to judge of his power of orientation. On some days he bumped into objects; on others he seemed to see. Holden states that his case does not belong to the usual form of mind blindness. Apraxia, according to Holden, is the inability to handle objects recognized. Serial sections showed that the connecting fibres between the external geniculate body and the calcarine cortex on each side were unbroken. The case differs from the ordinary case in that the calcarine cortex and optic radiations were preserved. Softening of the angular gyri and the parts adjacent, in which it is believed the higher visual centres lie, produced such marked disturbance of vision that it was a question much of the time whether the patient had any power of visual perception. The case seems to show, according to Holden, that extreme disturbance of vision may be produced by lesions in the higher cortical visual centres alone.

Hemiplegia. An excellent clinical study of hemiplegia, based on 160 cases, has been made by T. H. Weisenburg.[2] Hereditary tendency to hemiplegia, probably by disease of the bloodvessels, was shown in 14 cases; in one family there were 10 cases. In 17 cases pains of various character occurred before the onset of the hemiplegia. In seven instances the pain was described as violent, shooting, or cutting; in 2 as a dull, aching feeling, and in 5 as a tingling, tired, numb, or a pins-and-needle sensation. In all these cases the pains occurred on the side of the subsequent paralysis. The pains were felt mostly from twenty-four to forty-eight hours before, or else just before the onset of the paralysis. In 5 of the cases the pains ceased after the onset of the hemiplegia. Twenty-seven patients had distinct posthemiplegic, sharp, shooting pain, 12 had different forms of paræsthesia, and 70 complained of soreness in the muscles and joints of the paralyzed side.

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[1] American Journal of the Medical Sciences, May, 1905, p. 782.

[2] Journal of the American Medical Association, February 25, 1905, p. 603.

The respiratory movements of hemiplegics are said to be of greater amplitude on the paralyzed side in automatic breathing, but of greater amplitude on the sound side in forced breathing (Hughlings Jackson). Weisenburg believes that in automatic expiration the chest on the sound side has a longer range of movement; that is, it retracts more than does the chest on the paralyzed side. This means that the amount of air expelled from the lung on the sound side is greater, that there is more residual air at the end of expiration in the lung of the paralyzed side, and that the movement of the lung is actually weaker on the affected side.

Weisenburg reports extensive œdema occurring in hemiplegia in the paralyzed limbs; also postapoplectic involuntary movements and arthropathies. Atrophy of some degree he has found in every case.

The paper is so full of original observations and ideas that I would recommend it to anyone interested in the study of hemiplegia.

URÆMIC HEMIPLEGIA. It has always been difficult to explain why the paralysis of uræmia is so often unilateral, and the view has been advanced by some that a lesion of the motor area had occurred previously, but had not been sufficient to cause persistent hemiplegia; when uræmia developed later, however, the œdema of the brain and toxic cerebrospinal fluid produced symptoms by means of this latent lesion. Some clinical cases are reported by Castaigne and Ferrand,[1] in which a paralysis that had once been present reappeared under the influence of uræmia. Experiments on animals have produced similar results; for example, salt solution injected into the brain of living rabbits has produced transitory hemiplegia, and after intravenous injection of urine or after double nephrectomy the hemiplegia has reappeared. As a theory this is excellent, the only objection to it is that gross lesions of the brain have not been found in many cases of uræmic hemiplegia. Castaigne and Ferrand try to answer this objection by suggesting that the lesion preceding the uræmia may be one or more of the small areas of cerebral softening (lacunes) described by Marie and later by Ferrand. Doubtless there is much truth in this explanation, but it will not explain all cases, as shown by the important investigations of Weisenburg.

CEREBRAL HEMORRHAGE. The slow development of symptoms of pressure from hemorrhage on the brain is occasionally seen. W. C. Krauss,[2] for example, reports a case in which pain in the head and vomiting occurred some hours after a fall from a trolley car. Disturbance of speech was noticed about sixty hours after the injury, and Jacksonian epilepsy on the fourth day. A small localized hemorrhage of the cerebral membranes had developed on the side of the head opposite to where the blow had been received; this hemorrhage was slowly progressive, and extended backward and downward. The vessel injured was probably a small vein of the pia. The clot was removed at an operation, and the patient recovered entirely within a few weeks.

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[1] Semaine médicale, June 29, 1904, p. 201.

[2] American Journal of the Medical Sciences, September, 1904, p. 393.

SENSORY DISTURBANCES IN HEMIPLEGIA. In a case reported by Karl Schaffer,[1] in which the right frontal lobe and motor area were seriously affected by a syphilitic lesion, tactile sensation was completely lost in the fingers of the opposite hand, and impairment became less distinct as parts of the limb nearer to the trunk were examined. The same was true of the deep sensation (presumably sense of position is meant) and of stereognostic perception. Schaffer believes this case shows that disturbances of sensation may be caused by a lesion of the motor zone, as the parietal lobe was intact. It appears from the reading of his paper that he includes the postcentral convolution in the motor zone, nevertheless, it is striking that a lesion of this part could cause so grave disturbances of sensation.

THE DIRECTION OF TURNING IN HEMIPLEGIA. Leonard J. Kidd,[2] after observing hundreds of cases of organic hemiplegia and spastic paraplegia, has found that in fully 99 per cent. the patient spontaneously turned to the spastic or more spastic side when told to walk to the end of the room, turn around, and come back. He has never seen a functional hemiplegic turn around to the affected side. He concludes: 1. If a spastic hemiplegic or a spastic paraplegic turns around in walking to the affected or the more affected side an organic lesion is present. 2. If he turns to the sound or less affected side the case is either one of functional or of organic affection. If the latter, there will be no difficulty in deciding in its favor by a careful physical examination. Some observations made by R. Pemberton[3] show that the direction of turning in hemiplegia is unreliable.

ASSOCIATED MOVEMENTS. An extraordinary form of associated movement is called by W. G. Huet[4] heterotopic innervation. A workman presented peculiar contractions of the trapezius muscle when he spoke. The contractions were seen in the portion of the muscle attached to the third, fourth, and fifth cervical spines. When the man began to speak, a bundle of muscle fibres, 5 cm. in width, became prominent and remained so while he was speaking. The contractions disappeared during every pause in speaking, and seemed to change in intensity according to the variations in the voice. They were observed during singing, and faintly during swallowing, but not during whispering.

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[1] Neurologisches Centralblatt, November 16, 1904, No. 22, p. 1026.

[2] Review of Neurology and Psychiatry, November, 1904, No. 11, vol. ii. p. 742.

[3] Journal of the American Medical Association, June 17, 1905.

[4] Neurologisches Centralblatt, December 1, 1904, No. 23, p. 1085.

Huet suggests that nerve fibres arising in the vagus nucleus may have passed into the accessorius nerve and through its external branch to the trapezius muscle instead of to the larynx. Such an explanation seems reasonable for this extraordinary form of associated movement.

COLLATERAL HEMIPLEGIA. By collateral paralysis is meant a paralysis the result of a cerebral lesion on the same side as the paralysis. Such a condition is exceedingly uncommon and the diagnosis is extremely difficult. J. H. Pringle reports a case which he regards as one of this variety. The patient, a man, was brought to the hospital in coma and with a deep depression of the occipital bone. The right limbs were slightly rigid, the left were not, and when he was stimulated by pinching or pricking he at once moved the left limbs, but never moved the right limbs. He was never seen to make any spontaneous movement of any limb. Pringle made a diagnosis of hemorrhage in the left cerebral hemisphere, and regarded the depression in the skull as a long-standing fracture. At the necropsy a fissure fracture was found, commencing just anterior to the right parietal eminence, running downward and forward, and bifurcating into two limbs. One of these ended in the middle fossa at the sphenoidal fissure; the other in the anterior fossa in the orbital roof. There was no extradural hemorrhage, no hemorrhage over the left hemisphere, and no laceration of that side of the brain; but there was extensive laceration of the right frontal and temporosphenoidal lobes, with a large effusion of blood in the right, middle, and anterior fossæ, which extended well upward over the surface of the right cerebral hemisphere. No hemorrhage was found in the substance of the brain anywhere. Examination of the medulla oblongata did not show any obvious abnormality of the decussation. A microscopic examination does not appear to have been made.

Pringle[1] refers to a few similar cases and to the theories advanced in explanation of collateral hemiplegia. It was suggested by Morgagni that there may be an absence of the usual decussation of the pyramidal tracts, and the observations of Flechsig have given some support to this theory. A few cases of failure in the motor decussation are on record. It is true, as Pringle remarks, and this I have observed many times, that a patient may die who has manifested all the signs of a typical hemiplegia, and yet in the brain after death no lesion is found to account for the symptoms. I would add that no diagnosis of collateral hemiplegia can be accepted unless a thorough microscopic study of the central nervous system has been made, and that I have often seen lesions in the brain so small that they could not be detected with the naked eye. A small lesion within, and not a large hemorrhage upon, the brain may be the real cause of the hemiplegia. Cruveilhier has suggested that blood effused on one side of the brain might cause so much pressure of the opposite hemisphere against the skull as to produce paralysis. The explanation is of questionable value. This collateral paralysis is important chiefly from a surgical standpoint, because where it exists an operation is very likely to be done on the wrong side of the head. Pringle suggests that where the hemorrhage is not found, an opening should be made on the other side of the head, but this is a serious undertaking when the patient is suffering from a head injury.

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[1] Scottish Medical and Surgical Journal, 1904, vol. xv. p. 394

Dupré and Camus[1] report one of the rare cases of homolateral collateral hemiplegia. The motor decussation was incomplete and asymmetrical. The patient had double hemiplegia, the paralysis of one side dated from childhood, the paralysis of the other side of recent date.

SLOWLY DEVELOPING HEMIPLEGIA. Williamson[2] believes that hemiplegia of very gradual onset, where the loss of power becomes more marked day by day or week by week, is an almost certain sign of brain tumor, even in the absence of optic neuritis, headache, or vomiting. It may take weeks or a few months before the paralysis is complete. In such cases cerebral abscess must be thought of, especially if there are indications of suppurative disease in any part of the body. Williamson reports 3 cases in support of his statements, and in all 3 cases optic neuritis was absent. The hemiplegia of cerebral tumor is not invariably of gradual onset. In rare cases it is of rapid onset, especially when there is a hemorrhage around or within the growth. Hemiplegia of the gradual onset referred to does not occur in cerebral hemorrhage, embolism, or thrombosis, and there is no single sign, according to Williamson, of greater value in the diagnosis of brain tumor. Weeks at least are necessary for the development of the hemiplegia in order that the sign may be valuable.

HEMIPLEGIA FROM LESIONS OF THE THALAMUS. Thomas and Chiray[3] think that a lesion of the optic thalamus may be diagnosed when a hemiplegia at first intense diminishes, while sensory disturbances remain very marked and choreiform or athetotic movements appear in the paretic limbs. The sensory symptoms are persistent and pain is felt in the face and limbs of the anæsthetic side. The anæsthesia is unilateral and is more intense in the distal ends of the limbs.

Usually a lesion confined to the optic thalamus does not cause persistent hemiplegia, although it may cause hemiplegia at the time the lesion first develops. There are exceptions to this rule, and one such is reported by Dejerine and Thomas.[4] Hemiplegia persisted eight years in one of their cases, and yet there seems to have been no lesion of the pyramidal tract. A large part of the occipital lobe was softened and the thalamus was partly destroyed. This case is of special importance, because it was studied by microscopic sections. A satisfactory explanation for the paralysis is not given by the authors.

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[1] Revue neurologique, March 30, 1905, No. 6, p. 322.

[2] Practitioner, July to December, 1904, p. 321.

[3] Revue neurologique, May 30, 1904, No. 10, p. 505.

[4] Ibid., July 15, 1904, p. 655.

TREATMENT OF HEMIPLEGIA. Surgical treatment may be of some advantage in cases of partial hemiplegia. Usually the flexors of the upper limbs are stronger than the extensors. If in a case where the extensors are so weak that the flexors have little action, because of the slight resistance from the antagonistic muscles, nerve transplantation is performed, the power may be more equally distributed. It seems reasonable that we should attempt to side-track the excessive flexor power of partially paralyzed muscles, and to convert a part of it into extensor power. This mode of treatment promises to be of more service in cases of early developing hemiplegia than in those where the paralysis develops late. In athetosis the strength of the flexors in the upper limbs is often excessive, and the resistance to passive movement may be very great. Frazier and I[1] have studied a case of this kind, and the improvement produced by nerve transplantation is remarkable. Although only a few weeks have elapsed since the operation, the boy has more voluntary power, though less involuntary power, than he ever had in his life. His upper limbs were worse than useless, and it was quite an undertaking to dress him. He is now able to make voluntary movements of flexion and extension in the hand and forearm of the operated limb in a way he has never done before. This case has been successful even at the present time. Later a similar operation will be performed upon the upper limb of the other side.

Myasthenia Gravis. In a study of myasthenia gravis, made by W. Sterling,[2] the duration of the disease in 1 case was about twenty-three weeks. The shortest duration of a case, two to three weeks, has been reported by Widalé-Marcheses. The age of one of Sterling's patients was fifteen years. The youngest person afflicted with this disease was four and a half years old (Goldflam). Another of Sterling's patients was in better condition toward the evening than in the morning; this was especially true of the speech. Usually in myasthenia gravis the fatigue is more marked toward evening. In still another case, the only weakness observed was in the levator palpebræ superioris muscles. A similar case has been observed by Posey and myself. Sterling's patient had had the ptosis of varying intensity eleven years.

Cases of myasthenia gravis with muscular atrophy have been regarded by Oppenheim as atypical examples of this disease or as types of some other affection. This view is not shared by Pel,[1] who reports a case of myasthenia gravis with atrophy of the tongue.

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[1] Journal of Nervous and Mental Disease, May, 1905, p. 310.

[2] Monatsschrift für Psychiatrie und Neurologie, vol. xvi. p. 165.

In rare cases the weakness in myasthenia gravis may be confined to the ocular muscles. About 6 records of cases of this kind have been made. Recently two more papers have appeared. The symptoms in the case reported by Spiller and Buckman[2] were; rapid exhaustion of the levator palpebræ superioris of each side, partial recovery after rest, varying degree of paralysis of the external muscles of the eyeballs, with integrity of the inner muscles of the eyeballs, and a response of the sternocleidomastoid muscle, suggesting the myasthenic reaction. The patient stated that on arising in the morning the eyes were wide open and the double images were very close together, and at times he had no perceptible diplopia, but as he resumed the duties of the day all the symptoms returned. When he removed his glasses, one side of which had been kept covered, the upper lid of one eye, depending on which eye he had been using last, began to fall, and gradually the upper lid fell until there was complete ptosis. While this was occurring the upper lid of the other eye gradually drooped, until ptosis became complete or nearly complete on this side. When the upper lids had fallen, if he closed his eyes for two or three minutes, he could open them again.

In the case reported by M. Frank,[3] the patient was only ten years of age. Ptosis developed soon after the child arose in the morning. The eyelids could not be closed firmly, the occipitofrontalis was weak, and the external muscles of the eyeballs were affected. This case is especially interesting on account of the age of the patient and the limitation of the weakness, but the inability to tightly close the eyelids and the paresis of the frontalis muscle were not present in the case reported by Spiller and Buckman.

MYASTHENIA GRAVIS AND GRAVES' DISEASE. A case showing the occurrence of myasthenia gravis and Graves' disease in the same person is recorded by Richard Meyerstein,[4] and he refers to similar cases in the literature. He points out that the thymus gland plays a part in the pathology of myasthenia gravis. In some cases of Graves' disease the thymus gland has been found persisting and even hypertrophied. Investigations of Svehla and Reinbach seem to show that certain relations exist between the thymus and thyroid glands. In this way Meyerstein would explain the occurrence of myasthenia gravis and Graves' disease in the same case.

Amaurotic Family Idiocy. A typical case of this disease has been described by McKee,[5] and the ocular findings in the case have been reported by Mary Buchanan. Shumway and Buchanan confirm Holden's view that the essential change in the eyes is degeneration of the ganglion cells of the retina and of the nerve fibres of the optic nerves and tracts. The examination of the brain and cord by me showed widespread and intense degeneration of nerve cells and nerve fibres, and the changes in the nerve cells were like those I have seen in 2 cases that did not belong to amaurotic family idiocy.

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[1] Berliner klin. Wochenschrift, August 29, 1904, No. 35, p. 917.

[2] American Journal of the Medical Sciences, April, 1905.

[3] Ibid.

[4] Neurologisches Centralblatt, December 1, 1904, No. 23, p. 1089.

[5] American Journal of the Medical Sciences, January, 1905.

DISEASES OF THE SPINAL CORD.

Tabes. JUVENILE FORM. Marburg collected 34 cases of juvenile tabes, but Grinker[1] thinks this number is too large and that 20 would be an approximately correct number of reported genuine cases. He has observed a most extraordinary family. The mother married at eighteen, and had a son of this marriage, who now is thirty-eight years old and perfectly healthy. The first husband died of some acute disease. The woman nearly twelve years later married again, and had been healthy until her second marriage. Her second husband, a first cousin, had contracted syphilis. The first son of this second marriage had juvenile tabes, a second son had paretic dementia, a daughter had cerebral syphilis. The woman never had any premature births, although she had tabes. The first son, when about five years old and until his tenth year, had enuresis nocturna and diurna. After this he had difficulty in emptying the bladder. When he was about eighteen years old he accidentally discovered that his right eye was totally blind, and shortly afterward vision began to fail in the left eye. The diagnosis of tabes was made because of loss of tendon reflexes, ataxia, rigid and unequal pupils, primary progressive optic atrophy, ptosis, lightning pains, bladder disturbances, girdle sensation, and paræsthesia. Grinker finds that syphilis has invariably been present in every case of juvenile tabes. It is noteworthy that the most intellectual of all the children in this syphilitic family had paretic dementia.

Grinker reports another case of precocious tabes, in which the symptoms began when the patient was twenty-two years old.

Williamson[2] has observed 3 cases of juvenile tabes. The first case was as follows: A girl, aged eight years, had signs of early tabes; her father had contracted syphilis and presented the symptoms of advanced tabes; her mother had had four miscarriages. The second case was in a boy, aged thirteen years, who had the signs of early tabes and teeth characteristic of hereditary syphilis (Hutchinson's teeth). The third case was in a girl, aged seventeen years, who had had symptoms and signs of tabes for seven years, whose father had had syphilis, and whose mother had had several miscarriages. These cases, like most of the others of juvenile tabes reported in the literature, showed the causal relation of syphilis to tabes.

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[1] Journal of Nervous and Mental Disease, December, 1904, p. 753.

[2] Review of Neurology and Psychiatry, June, 1904, p. 425.

Hagelstam[1] has collected from the literature 42 cases of tabes or tabes paresis beginning in childhood or youth, and to these he adds 3 cases of his own; 16 of these cases were in males and 29 in females. If 6 cases in which paresis was a complication are excluded, 13 cases were in males and 26 in females. In more than 25 per cent. of the 45 cases tabes, paresis, or cerebral syphilis had occurred in one parent, and in a few cases in both parents. It is certainly striking that tabes in the young seems to be more frequent in females, as the relationship between the sexes is reversed in cases in which tabes begins in adult life. An argument for the syphilitic etiology is found in these relationships, because where syphilis is hereditary females are as likely as males to develop tabes, whereas in later life males are more likely to acquire syphilis.

OCULAR DISTURBANCES IN TABES. Bregman[2] has made some interesting observations on the visual disturbances of tabes. The disease of the posterior root fibres is manifested by loss of function as well as by signs of irritation, namely, by anæsthesia associated with pain, but almost nothing of this character regarding the optic nerve has been seen, and there is usually loss of vision without any signs of irritation of the visual fibres. Bregman has found a remark of Gowers which shows that the distinguished English neurologist has paid attention to this subject, for he says that sometimes during the course of optic nerve atrophy lightning-like light sensations occur. Something similar is reported by Alter: A patient with paretic dementia had attacks during which everything appeared green, lasting one to two hours, and then occasionally giving place to total achromatopsia. The objects assumed various shades of green. These attacks were supposed by Alter to be caused by irritation of the occipital lobe, but, as Bregman remarks, they might have been a sign of irritation of the optic nerves. Bregman had a patient with tabes who had optic nerve atrophy. All objects appeared to him green or violet; usually only one color at a time was visible, and usually when he looked at an object it was first green and then violet, although occasionally violet was first seen. When the eyes were closed the colors were still visible. After a time this green-and-violet vision disappeared and then returned only occasionally. The phenomenon was supposed to be the result of irritation of the optic nerves.

The disturbance of convergence and the appearance of nystagmus in tabes are so rare that when they occur one might think of a complication or might doubt the correctness of the diagnosis. Hans Curschmann[1] reports a case which seems to have been one of tabes, possibly passing into paretic dementia, and in which there were slight bilateral abducens paresis and slight horizontal, occasionally rotatory, nystagmus in lateral movements. Most extraordinary was a convergence spasm. Occasionally while one eye was directed outward it would be drawn forcibly into convergence position and would thus remain a few seconds and then return to incomplete abduction. The spasm was more apparent in the right eye. Convergence spasm occurred at times when the patient looked upward or upward and inward.

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[1] Deutsche Zeitschrift für Nervenheilkunde, No. 3, vol. xxvi. p. 268.

[2] Ibid., Nos. 4 to 6, vol. xxvi. p. 525.

EARLY DIAGNOSIS OF TABES. It is impossible to emphasize too strongly the importance of recognizing tabes in the incipient stages. Occasionally operations have been performed that should never have been permitted. Abner Post[2] reports a case in which a long scar was found on the right side of the abdomen, which, according to the patient, had been made two years previously. He said that at that time he had had abdominal symptoms, of which pain was the most marked, and raised a suspicion of gastric ulcer. Later, this diagnosis was changed to one of appendicitis. The symptoms were somewhat indefinite, but so severe as to demand an exploratory operation. The appendix was found to be normal, but was removed, and the incision was extended so as to allow of the examination of the gall-bladder and its vicinity. Nothing abnormal was found. Paroxysmal pain had continued during two years, and was probably the pain of gastric crises. The man had difficulty in emptying the rectum and bladder, loss of patellar reflexes, and rigidity of the pupils, suggesting tabes, and in addition he had certain disturbances of speech like those of paretic dementia.

Gastric crises seldom cause a fatal termination of the disease. That they may do so, however, is shown in the report of a case by L. J. Kidd.[3]

Sudden retention of urine in a girl previously healthy was the first sign observed by Richard Birnbaum[4] in a case of tabes. This occurrence is rare, but not unknown.

HYPERTONIA AND HYPOTONIA. The combination of hypertonia with hypotonia is unusual, but is occasionally seen, as in a case reported by Bychowski.[5] His patient was a woman, aged sixty-five years, who had had tabes dorsalis more than thirty years. Hypotonia was very pronounced in the lower limbs, while hypertonia was present in the upper limbs. There was an association of two groups of symptoms; on one side lancinating pains, inco-ordination, disturbance of sensation, loss of the tendon reflexes, and hypotonia; on the other side rigidity of muscles, mask-like face, typical tremor, and sensation of burning—a combination of the symptoms of tabes with those of *paralysis agitans*. Bychowski has been able to find references to cases somewhat similar to his, but contents himself with giving the clinical notes of his case without entering into a discussion of a possible relation between tabes and paralysis agitans.

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[1] Neurologisches Centralblatt, January 1, 1905, p. 10; Deutsche med. Wochenschrift, 1904, 2, p. 1081.

[2] Boston Medical and Surgical Journal, September 8, 1904, p. 266.

[3] Lancet, November 5, 1904, p. 1282.

[4] Deutsche med. Wochenschrift, 1904, 2, p. 1572.

[5] Neurologisches Centralblatt, September 1, 1904, p. 786.

TREATMENT OF TABES. Raymond[1] has found that the pains of tabes almost always disappear after one or more applications of a tube containing a small quantity of *radium*. The tube was placed over the painful points for five to twenty-five minutes. When a tube containing some other substance was substituted no relief from pain was obtained. This is an important result if confirmed by the experience of others.

Gowers,[2] in an interesting lecture on the pains of tabes, refers to the treatment of this condition. Only superficial pains, he thinks, can be relieved by local measures. Chloroform sprinkled on lint with oiled silk over it may give temporary relief. More lasting is the effect of hypodermic injection of cocaine at the upper part of the area in which the pains are felt. A quarter or a third of a grain may be sufficient to quiet the pain for one or two hours, and often to give permanent relief. It is probable, in Gowers' opinion, that some effect would be produced by the electric administration of cocaine. When rubbed into the skin it has hardly any influence on sensation. Voltaic electricity has no influence on the pains, whichever pole is applied. If the positive electrode of a voltaic battery is saturated with a solution of cocaine, 6 or 10 per cent., the sensibility of the skin is abolished to both touch and pain in ten minutes, and after a longer application the effect continues for about twice the time the current has been allowed to pass. No such effect is obtained with the negative electrode. Applications have not much effect on the deeper pains. A deep injection of cocaine has little effect on the severe pains which are in the softer substance of a limb. Where the tissues are less in amount, as in the foot, pains that seem deep and do not cause tenderness of the skin may be stilled in a few minutes by an injection at the upper part of the region to which they are referred. Antifebrin (acetanilid) is the most effective of the coal-tar preparations, Gowers thinks, in quieting pain, but it is the least prescribed. He has not obtained any evidence that it is more dangerous than the other products. Ten grains of acetanilid, he says, are equivalent to fifteen grains of antipyrin.

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[1] Semaine médicale, July 27, 1904, p. 237.

[2] British Medical Journal, January 7, 1905, p. 1.

The effect of any of these coal-tar preparations is greatest when the given quantity is in a single dose, and the relief of pain is greater when the drug is administered at the beginning of an attack than when the pains have become well developed. In some cases of tabetic pain morphine may be required. Gowers has faith in chloride of aluminum, given in doses of 5, 8, or 10 grains, three times a day, and he believes that it lessens the tendency to pain. It is soluble in water. I am sorry to say that in my hands this drug has not been very efficacious. The salicylates and aspirin (salicylacetic acid) Gowers also finds useful. I have employed aspirin internally and mesotan in a 25 per cent. mixture externally with considerable success in various forms of pain.

Paretic Dementia. An extraordinary case of paretic dementia is reported by O. Foerster.[1] After typhoid fever a disease of the nervous system developed, which symptomatically was exactly like paretic dementia, and yet complete recovery occurred. The author does not regard the disappearance of the symptoms as an intermission, which is not uncommon in paretic dementia. Since the end of 1900 the man has performed his work and has shown no symptoms of disease. He was last seen in March, 1903, at which time he was able to do examples in arithmetic, had no longer syllable slurring; the tongue showed no tremor; there was no weakness of the facial or hypoglossal nerve, and no tremor of the hands. The author thinks his case is unique.

M. Reichardt,[2] after making a careful study of many cases of paretic dementia, both clinically and pathologically, has found that in every case in which pupillary rigidity existed, degeneration was present in the zone between the columns of Goll and Burdach—*i. e.*, in v. Bechterew's intervening zone—and was most distinct in its ventral portion at the second and third cervical segments. In all cases of paretic dementia in which the pupils were normal, a greater or less number of normal fibres were found in the intervening zone. He concludes from these findings that a degeneration in the ventral portion of the intervening zone, especially of the third cervical segment, is the cause of pupillary rigidity.

Spinal Tumor. Lesions of the spinal cord other than tumor may cause symptoms so much like those of tumor that a mistake in diagnosis is readily made. In a case reported by Raymond and Cestan[3] a progressive spinal hemiplegia was caused by numerous vascular dilatations of the cervical region of the cord. The patient, a male, was twenty years of age. When seventeen years old pain was felt in the back of the neck, and it radiated into the right upper limb, and the right upper and lower limbs gradually became weak. The face was not affected. The tendon reflexes in the right lower limb were exaggerated, and Babinski's sign was obtained on this side, but not on the other. The right deltoid, biceps, brachialis anticus, and supinator longus were atrophied, and hyperæsthesia was present in the territory of the cervical plexus and superior part of the brachial plexus. The symptoms gradually increased, and the left side of the body became affected. A diagnosis of cervical myelitis from compression by a tumor was made, and operation was determined upon, when la grippe caused the patient's death. The symptoms had lasted three years. Many dilated vessels were found about and within the spinal cord in the cervical region, and the condition was regarded as one of cirsoid aneurysm, a very uncommon lesion of the spinal cord. It is fortunate that operation was not attempted, because merely opening the dura mater might have caused intense and fatal hemorrhage.

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[1] Monatsschrift für Psychiatrie und Neurologie, December, 1904, p. 583.

[2] Archiv fur Psychiatrie, No. 1, vol. xxxix, p. 324.

[3] Revue neurologique, May 30, 1904, No. 10, p. 457.

Cysts of the Cord. Cysts of the vertebral canal are so rare, especially if they are not parasitic in origin, that the report of a case of this character by A. Schmidt[1] is of unusual interest. The cyst seems to have been on the external part of the spinal dura and was 7.5 cm. long and 1.5 to 2 cm. broad. It was removed at operation. The symptoms caused by it were those of spinal tumor. It was not a parasitic cyst and was regarded as a connective-tissue formation. The only case that has a resemblance to it is one reported by Spiller, Musser, and Martin, but in our case the cyst was formed from the pia and not from the dura.

Carcinoma of the Spine. It is difficult to understand how removal of the ovaries can have any effect on carcinoma in remote parts of the body. Beatson, of Glasgow, in 1896, reported cases in which this operation caused the disappearance for some time of cancer of the breast. Boyd, in 1900, reported the results in 54 cases, in 19 of which oöphorectomy gave more or less benefit. In some the carcinoma had not returned, although several years had elapsed; in others the duration of the disease was more or less prolonged. Zenner[2] refers to these facts and reports an unusual case. In December, 1897, a carcinoma of the left breast was removed. In November, 1899, a small mass was found in the left axilla. Both ovaries were now removed, in the hope that oöphorectomy would arrest the growth of the carcinoma. The pain began in the fall of 1900, three years after the removal of the breast, and nearly one year after the removal of the ovaries. For a few months the pain was confined to the left lower limb, but later the symptoms of carcinoma of the vertebræ and paraplegia dolorosa developed. The patient died June 6, 1903, and a necropsy was not obtained. Zenner speaks of the long duration of the spinal disease—nearly three years. In all the other cases of carcinoma of the spine he has seen, the duration of the process has been only a few months, and this seems to be the general experience. He, therefore, asks whether the long course in his case was caused by removal of the ovaries.

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[1] Deutsche Zeitschrift für Nervenheilkunde, No. 3, vol. xxvi p. 318.

[2] Journal of Nervous and Mental Diseases, January, 1905, p. 33.

Lateral Sclerosis. Strümpell's[1] work on primary degeneration of the pyramidal tracts has extended over many years, and he has made valuable contributions to the subject. In his latest paper he reports 3 cases of this kind with necropsy; in the first there was a primary degeneration of the crossed pyramidal tracts, extending from the lower lumbar to the upper cervical region; the nerve cells and all parts of the peripheral motor segments were normal. The direct pyramidal tracts, the direct cerebellar tracts, and the columns of Goll in the cervical region were slightly degenerated. In only 1 of the 3 cases was there any degeneration of the nerve cells, and in that it was slight.

Strümpell remarks that when spastic spinal paralysis begins in early life the knees are slightly flexed, but when it begins in adult life they are extended; the former condition he attributes to the arrest of development in the muscles most affected—viz., the flexors.

There can be no doubt now that primary symmetrical degeneration of the pyramidal tracts without implication of nerve cells does occur, and the symptoms of this alteration are hypertonia of the muscles, with exaggeration of tendon reflexes of the lower limbs; later there may be paresis, but the rigidity precedes the weakness.

In one group of spastic spinal paralysis are to be placed those cases in which there is a family or hereditary tendency to the disease; males are especially affected; the disease begins between the twentieth and thirtieth years of life; the lower limbs alone are affected and the course is very slow.

In another group are to be placed the cases in which the symptoms begin in childhood, but are acquired after birth and are not from trauma. The mental development may be imperfect.

In another group are the cases in which the symptoms begin in adult life, rigidity is general, and later the peripheral motor neurones are affected; so that the disease becomes closely related to amyotrophic lateral sclerosis. Such cases do not usually occur in families.

In a fourth group is the syphilitic spastic spinal paralysis, and in still another may be placed cases in which the symptoms appear after pregnancy and childbirth.

Family Form of Spastic Paraplegia. Newmark[2] gives the later histories of the cases of family spastic paraplegia he reported in 1893, and takes this opportunity for a study of the disease. He shows that the symptoms do not begin at the same age in different members of the same family.

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[1] Deutsche Zeitschrift für Nervenheilkunde, Nos. 3 and 4, vol. xxvii. p. 291.

[2] Ibid., Nos. 1 and 2, vol. xxvii. p. 1.

Injury or an intercurrent malady may hasten the development of the symptoms, and in milder cases improvement is possible; in other cases progression may occur after a long intermission. The microscopic examination of one of Newmark's cases showed degeneration of the crossed pyramidal tracts and of the posterior columns, although the latter does not appear to have caused clinical manifestations. The family form of spastic paralysis is one of the most remarkable of hereditary diseases. The symptoms are motor, and although disturbances of sensation have been observed in a few cases they have been slight. Implication of the brain does not occur in the typical cases.

Lead as a Cause of Spastic Paralysis. It is difficult to understand in what way lead causes spastic spinal paralysis, and the cases with such an etiology must be exceedingly rare. In a case observed by Carl Bechtold,[1] symptoms of chronic lead poisoning and of spastic spinal paralysis were present at the same time, and the lead poisoning was supposed to be the cause of the paralysis. The possibility of this occurrence is recognized by Oppenheim, but the way in which the paralysis is produced is unknown. Tabes also has been attributed to lead.

Poliomyelitis. The implication of the abdominal muscles in acute anterior poliomyelitis is of much interest, because it is a subject that has not received the attention due to it, and because the diagnosis may be difficult. Indeed, I have had for some time under my care a case which may be one of anterior poliomyelitis confined to the thoracic region, and yet the positive diagnosis in this case is impossible at present. W. B. Cornell[2] remarks that many cases showing participation of the abdominal muscles are overlooked, and that the tendency in the vast majority of cases is to rapid recovery when the muscles are affected. Cornell reports a case in which at first the right leg and left arm were paralyzed after an acute onset, but later these limbs recovered their function. As the child cried and raised the intra-abdominal pressure, the right side of the abdomen ballooned out very markedly. On palpation the muscles could be felt to contract under the hand on the left but not on the right side. In the erect position the conditions were intensified and the left side of the abdomen became quite prominent. The paralyzed muscles were the oblique, the transversalis, and half of the rectus abdominis on the right side. The electric reactions could not be tested, as the child cried every time the current was applied. There was no lordosis, but there was a slight sclerosis in the lumbar region, with a convexity to the right. As rare as the implication of the abdominal muscles in acute anterior poliomyelitis is the paralysis of the facial muscles, but this also occurs.

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[1] Münchener med. Wochenschrift, September 13, 1904, No. 37, p. 1648.

[2] Bulletin of the Johns Hopkins Hospital, January, 1905, p. 11.

PROGRESSIVE SPINAL MUSCULAR ATROPHY. Chronic poliomyelitis is difficult to separate from progressive atrophy of spinal origin. The disease is rare, and especially when occurring in the family form. Bruining[1] has observed it in father and son. In the former the weakness and atrophy began in the right lower limb near the trunk, and within six months similar symptoms were observed in the shoulders and upper limbs and later in the left lower limb. There were no pains and no paræsthesia. The nerve cells of the anterior horns throughout the spinal cord were degenerated. A necropsy was not obtained in the second case. In both there were progressive paralysis and atrophy of muscles, loss of tendon reflexes, fibrillary twitchings, and reaction of degeneration. Subjective and objective sensations were almost normal, and bladder and rectum were intact. In the son the process began in the muscles of the neck and shoulder.

Occasionally a case of chronic anterior poliomyelitis with necropsy is reported, showing that the disease should be regarded as distinct from amyotrophic lateral sclerosis. Such a case is that recorded by Aoyama.[2] One cannot be quite certain, after reading the description of the findings in this case, that the pyramidal tracts were normal, because the Marchi stain seems to have shown degeneration throughout the white matter in the spinal cord. The nerve cells of the anterior horns were much degenerated.

TREATMENT OF ANTERIOR POLIOMYELITIS. The cases in which paralysis persists in a group of muscles, or, better still, in only one muscle, may be benefited by the transplantation of the nerves of the diseased muscles into healthy nerves in the neighborhood. In a case observed by Young and myself much improvement was obtained in the paralysis, and in another reported by Frazier and myself[3] the improvement was not so distinct. The method of operation has been described in connection with these reports.

Multiple Sclerosis. Oppenheim has observed 2 cases of *syringomyelia* associated with cervical ribs, and now Hugo Levi[4] reports a case of multiple sclerosis associated with cervical ribs. It would seem that both these nervous diseases and the cervical ribs are congenital anomalies.

Hæmatomyelia. Taniguchi[5] remarks that no one seems to have observed tubular hemorrhage of the spinal cord as a result of tumor. Leyden and Goldscheider have mentioned the possibility of such a cause, but have not offered the proof, nor have they referred to the occurrence of a carcinoma in the spinal cord. Taniguchi has had a case in which metastasis in the lumbar region of the cord occurred from bronchial carcinoma, and the small spinal tumor was the source of an extensive tubular hemorrhage. The spinal tumor was not secondary to vertebral carcinoma.

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[1] Deutsche Zeitschrift für Nervenheilkunde, Nos. 3 and 4, vol. xxvii. p. 269.

[2] Ibid., Nos. 4 to 6, vol. xxvi. p. 375.

[3] Journal of the American Medical Association, January 21, 1905,

[4] Neurologisches Centralblatt, November 1, 1904, No. 21, p. 988.

[5] Deutsche Zeitschrift für Nervenheilkunde, Nos. 1 and 2, vol. xxvii. p. 148.

It would be almost impossible to make a correct diagnosis during the life of the patient in such a case as Taniguchi describes. In most cases of hæmatomyelia trauma is the cause, and the diagnosis is not so difficult, but I have tried to show that the clinical diagnosis between traumatic hæmatomyelia and traumatic myelitis is almost an impossible one.

Combined Sclerosis. Combined sclerosis of the spinal cord resulting from senility has not received much attention. In a case reported by Wilson and Crouzon[1] the clinical study was very imperfect. There was a combined sclerosis of the posterior and lateral columns of the cord. The sclerosis in the lateral columns extended from the lumbar region to the medulla oblongata, and had its maximum intensity in the upper thoracic region. In the posterior columns the sclerosis was found in the inferior thoracic segments, and increased as higher levels were studied, and could be traced to the medulla oblongata. The sclerosis appeared to be systematized, on the one hand occupying the pyramidal zones throughout, scarcely reaching the periphery, except over a small section of the cord; on the other, being confined to the columns of Goll and to the ventral zone of the posterior columns. Combined senile sclerosis, especially the systematized form, is worthy of more attention than it has received.

Early Development of Syphilis of the Nervous System. According to Sicard and Roussy,[2] syphilis of the nervous system occurring soon after infection has been reported by Dieulafoy and others, but there is no mention in these observations of the symptom-complex of diffuse acute meningitis. The symptoms are those of arterial obliteration, and the microscopic examination has shown vascular lesions more or less localized to the large branches from the circle of Willis. Sicard and Roussy report a case in which nervous symptoms appeared about three months after syphilitic infection, and later syphilitic cerebrospinal meningitis was found.

Abscess of the Spinal Cord. It is extraordinary that Turner and Collier[3] should have been able to report 3 cases of abscess of the spinal cord, because the condition is so rare that few neurologists have an opportunity to see a single case. In their first case the local necrotic lesion resulted from the pressure of a new-growth of carcinomatous nature; in their second case it resulted from tuberculous pachymeningitis associated with spinal caries, and in their third case from the pressure of extrathecal tuberculous matter associated with old spinal caries. In all 3 cases suppuration, commencing doubtless in a necrotic region of limited extent, spread in the length of the spinal cord far above and below the area of original damage.

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[1] Review of Neurology and Psychiatry, June, 1904, p. 431.

[2] Revue neurologique, May 30, 1904, p. 491.

[3] Brain, Summer, 1904, vol. xxvii. p. 199.

Myelitis. Disturbances of urination are common in myelitis and other diseases of the spinal cord. Frankl-Hochwart and Fröhlich[1] seem to have shown that the first act in urination consists in relaxation of the sphincter of the bladder and not in the overcoming of the sphincter by the contraction of the detrusor. Experiments by which the detrusor was placed out of function showed that urination could be produced by electric irritation of the cerebral cortex, and in this way by relaxation of the sphincter of the bladder. These are important observations, because they seem to show that in lesions of the spinal cord or brain the disturbance in micturition may depend upon a lesion of the fibres controlling the action of the sphincter, as well as on a lesion of the fibres innervating the detrusor.

Reflex Paraplegia. A peculiar form of reflex disturbance is described by Urbantschitsch.[2] He thinks that paralysis or paresis of the upper and lower extremities, disorders of writing and of speech, of tactile and temperature sensation, and asthenopia may be caused by affections of the sensory nerves of the head, especially of those of the ear. Cocainization of the affected sensory areas of the head may diminish the symptoms, and cure of the aural disease may remove them. An explanation of the manner in which middle-ear disease produces paralysis of limbs reflexly is not given. It appears from the description of the illustrative cases that Urbantschitsch does not regard these symptoms as signs of a neurosis. The paper is so extraordinary that judgment cannot be passed until the subject has been studied by others and some explanation for the phenomena offered.

Landry's Paralysis. There seemed to be some relation between cystitis and acute ascending paralysis in the 3 cases reported by T. J. Walker.[3] All 3 patients had had chronic cystitis; in the first and third cases death occurred eighteen hours after the onset of the paralysis of the limbs, and in the second case forty-eight hours after the onset of the paralysis. Each of these 3 cases was distinguished by the sudden invasion of the paralysis, by its very rapid progress, and by its occurrence as the fatal termination of a chronic cystitis. No necropsy was obtained. The explanation Walker offers for the association of cystitis with Landry's paralysis is that micro-organisms were present in the urinary organs, probably in the bladder, and at a certain stage in the cystitis were conveyed along the nerves to the spinal cord, where they developed rapidly and produced a virulent intoxication. The weakening of the tissues by the long-standing cystitis predisposed to the paralysis. These cases seem to belong to the class known as "urinary paraplegia," but we are a long way from a satisfactory understanding of the condition. "Urinary paraplegia" has been recognized since the time of Stanley (1833), but there is need for much work on the subject.

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[1] Neurologisches Centralblatt, July 16, 1901, p. 646.

[2] Deutsche Zeitschrift für Nervenheilkunde, No. 3, vol. xxvi. p. 199.

[3] Lancet, March 11, 1905, p. 636.

Vertebral Caries. E. W. Taylor[1] has reported the careful study of a case of tuberculous caries of the vertebræ developing rapidly in a man aged forty-five years. The spinal canal at the necropsy was found free from tuberculous deposits, and Taylor believes that bony compression of the cord accounted in a measure for the pronounced symptoms. A further cause he believed was to be found in the high degree of pathological changes within the cord, these being of the character of vascular alteration with œdema, although œdema at the late stage when the cord was studied was not distinct. In the absence of extradural and intradural tuberculosis, no other explanation appeared reasonable to Taylor, unless some toxin was supposed to have been active. This patient improved under treatment, as do so many others with caries of the vertebræ. Taylor does not believe in laminectomy for cases such as his. If the disease is in an early stage operation is unnecessary, and if in a late stage it is unavailing. I may add that I have known operation to be distinctly harmful. I had the opportunity a few years ago to observe a case in which operation had caused loss of control of the bladder and rectum and loss of sensation in the lower limbs. The man had been paralyzed and extension had not been of benefit, but until he was operated upon he had controlled the rectal and vesical sphincters and had had sensation in his lower limbs.

Taylor's case is one of the few which show that pressure may be caused by displaced bone in caries of the vertebræ. Usually the pressure is from external spinal pachymeningitis.

Injury of the Spinal Column. Atrophy of symmetrical muscles from injury of the spinal cord, when the atrophy is confined to only one or two muscles in each limb, is an uncommon finding. Albert Knapp[2] has observed a case in which pressure upon the back caused bilateral wasting of the calf muscles. The patient immediately following the accident had great weakness of both lower limbs and difficulty in passing urine and feces. Atrophy of the calf muscles was associated with stocking form of hyperæsthesia for all forms of sensation in both feet and in the lower part of the legs. The gait was not much impaired when the patient came under Knapp's observation. A similar case does not seem to have been put on record. Knapp thinks compression of the spinal cord could not have caused the symptoms, because of absence of paralysis in the muscles of the feet and of absence of spasticity at the ankles; neither is it likely that there was a circumscribed lesion of the anterior horns of the spinal cord. The explanation offered is that during the bending of the trunk forward by the pressure upon the back, spinal nerves were stretched in their passage through the intervertebral foramina. Although the atrophy of the calf muscles had lasted about twenty years, the gait was very little disturbed, because the deeper muscles on the back of the legs had hypertrophied.

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[1] Boston Medical and Surgical Journal, December 1, 1904, p. 595.

[2] Monatsschrift für Psychiatrie und Neurologie, vol. xvi. p. 161.

Spinal Localization. In a previous paper I have attempted to prove that the sensory zone in which the umbilicus lies represents the border between the ninth and tenth thoracic segments of the spinal cord, but from a recent study in association with T. H. Weisenburg,[1] it has seemed more probable that the umbilicus lies within the ninth thoracic sensory zone rather than on its lower border. This determination is important in cases in which operation on the spinal cord is needed, because if anæsthesia extends from below upward to about one inch below the umbilicus we may conclude that the tenth thoracic segment of the spinal cord is seriously injured, while the ninth is not.

DISEASES OF THE PERIPHERAL NERVES.

Neuritis. The development of multiple neuritis within one or two hours is uncommon, and the name of apoplectiform neuritis has been given to this variety. I have at present a patient in whom the nerves of all the limbs became paralyzed in less than twenty-four hours, but A. Westphal[2] reports a more rapid development than this. A woman afflicted with senile melancholia had double pneumonia; mental symptoms were present, and suddenly complete paralysis of the right upper limb occurred. This paralysis lasted six weeks until the patient's death. There was no reason to attribute it to pressure. The electric reactions were quantitatively diminished, but not qualitatively. Hyperæsthesia and hyperalgesia of the skin of the paralyzed limb were found. The microscopic examination showed parenchymatous neuritis of the right upper limb, more intense in the distal parts. The muscles also were implicated. Fibrinous internal pachymeningitis was found extending from the cervical to the lumbar region, and nerve cells of the anterior horns in various parts of the cord were diseased, but more intensely in the right side of the cervical region. A few other cases of apoplectiform neuritis are described in the literature. Hemorrhage compressing the brachial plexus has been the cause occasionally. It has been shown that in cachectic persons the peripheral nerves may be diseased, although in life no symptoms indicative of this had been seen. Westphal believes that in his case senile changes in the nerves, toxic effects of the pneumonia, possibly slight injuries, and overexertion of the right upper limb during delirium explain the neuritis, but the apoplectiform onset is not very easily understood.

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[1] Review of Neurology and Pyschiatry, October, 1904.

[2] Archiv für Psychiatrie, No. 1, vol. xl. p. 64.

It is important to know that the patellar reflex may be lost and that rigidity of the pupil may be present in croupous pneumonia, probably as the result of some toxin.

Interstitial Hypertrophic Neuritis. It is singular that Martin Brasch,[1] in reporting two cases of interstitial, hypertrophic, and progressive neuritis of childhood, should show a want of familiarity with the literature of this disease, and should regard his cases as atypical examples of neurotic muscular atrophy, without any reference to the fact that Dejerine and Sottas, and later Dejerine alone, have maintained that the two diseases are distinct. In Brasch's cases the lancinating pains and disturbances of sensation were not so severe as in Dejerine and Sottas' cases, but Brasch also observed the myosis and rigidity of the pupils, the ataxia and Romberg's sign, the kyphoscoliosis, and the enlargement of the peripheral nerves. The interstitial, hypertrophic, and progressive neuritis of childhood resembles neurotic muscular atrophy in the wasting of the distal extremities of the limbs, and yet it presents in addition many of the signs of tabes.

Gonorrhœal Neuritis. Cases of multiple neuritis caused by gonorrhœa are not numerous, and it is difficult to prove that the neuritis is a result of gonorrhœa. Ménétrier[2] has had under his observation a patient, a man aged forty-six years, who, while having gonorrhœa, developed paresis and pain in the limbs, especially in the lower limbs, atrophy and objective disturbance of sensation, and impairment of the patellar reflex. He died from bronchopneumonia. The microscopic examination showed degeneration of the peripheral nerves and changes in the nerve cells of the anterior horns of the spinal cord secondary to those of the nerve fibres. There seems to be no doubt that during the time this patient had gonorrhœa he developed multiple neuritis, but the evidence is not fully convincing that the former caused the latter, and yet it probably did.

Facial Palsy. Seiffer[3] has observed a case of facial paralysis in which Bell's phenomenon was not as it is usually seen; instead of the eyeballs rolling upward and outward in an attempt to close the eyelids of the paralyzed side, they rolled inward or downward. This was not caused by paralysis of any of the external ocular muscles, because the eyeballs could be moved voluntarily in all directions. Only one or two similar cases seem to have been observed, and an explanation for the phenomenon is not given.

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[1] Deutsche Zeitschrift für Nervenheilkunde, No. 3, vol. xxvi. p. 302.

[2] Semaine médicale, June 22, 1904, p. 197.

[3] Berliner klin. Wochenschrift, July 11, 1904, No. 28, p. 770.

Shumway[1] has observed *optic neuritis* occurring in a case of facial palsy. This is not a common association, and may be the result of rheumatism or of infection or of unknown cause. The optic neuritis is usually of the retrobulbar type, but a decided papillitis may be present. He gives the notes of two cases of facial palsy in which flattening of the face and enophthalmos occurred on the paralyzed side. The flattening of the face might be a result of atrophy of the facial muscles, but the enophthalmos is not easy to explain.

The view is held by some neurologists that the facial nerve supplies fibres to the lacrymal gland and occasionally in facial palsy, as in three cases observed by Scheiber,[2] the secretion of tears on the paralyzed side ceases. Ringing in the ears Scheiber explains as caused by the implication of the acoustic nerve. Some cases seem to show that the trigeminal nerve alone innervates the lacrymal gland; so that the question at present is an open one.

Objective disturbance of sensation in the face observed in facial palsy Scheiber ascribes to the presence of sensory fibres in the nerve.

Measles as a Cause of Neuritis. Multiple neuritis may occur after almost any infectious disease and is not uncommon in association with influenza, but Edens[3] has observed a case in which it seemed to be caused by measles. He refers to two cases in which it was caused by *scarlet fever*, and says these are the only reported cases (Egis).

Neuritis from Cervical Rib. A cervical rib, as Seiffer[4] points out, may cause mistakes in diagnosis. It may give the symptoms of compression myelitis of the cervical cord from spinal caries, or from vertebral or spinal-cord tumor, or those of syphilitic meningitis of the cervical region, or those of syringomyelia, or those of progressive muscular atrophy, or those of peripheral or plexus neuritis. Muscular atrophy of the thenar and hypothenar eminence may be the only pronounced sign for a long time, and a cervical rib may be unsuspected; whereas, if a correct diagnosis were made, operation might arrest the progress of the atrophy. Symptoms of lesion in the brachial plexus or cervical cord should suggest the possibility of a cervical rib, but a cervical rib usually does not cause symptoms. The x-ray helps greatly in the diagnosis.

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[1] Journal of the American Medical Association, February 11, 1905, p. 463.

[2] Deutsche Zeitschrift für Nervenheilkunde, Nos. 1 and 2, vol. xxvii. p 45.

[3] Berliner klin. Wochenschrift, August 8, 1904, p. 849.

[4] Monatsschrift für Psychiatrie und Neurologie, October, 1904, p. 425.

Seiffer reports an isolated paralysis of the musculocutaneous nerve of the upper limb in a man who was a player on the violoncello. This case seems to make only the third reported, in which there was a true neuritis confined to the musculocutaneous nerve, and, according to Bernhardt, there are but 12 or 14 cases of this form of paralysis known. Usually the cause has been trauma. Because of the intense atrophy of the biceps, Seiffer was able to cause contraction in the outer part of the brachialis anticus with the electric current. This part of the muscle is innervated by the musculospiral nerve. No contraction could be obtained in the inner portion of the brachialis anticus, because here the nerve supply is from the musculocutaneous.

Mononeuritis. As examples of sensory mononeuritis, R. Kutner[1] describes a case of paralysis in the distribution of the fifth nerve, another of neuritis of the saphenous major, another of neuritis of the peroneus superficialis, another of paralysis of the acusticus and facialis. The first case is the most interesting. The paralysis came on after exposure to draught. Paræsthesia was felt in the distribution of the left trigeminus, and this area was hyperæsthetic. Pain does not seem to have been felt. The mononeuritis of the lower limbs was caused by alcohol. Both nerves that were affected pass through dense fascia. In one case the neuritis developed three weeks after alcohol had been taken, but the metabolic changes caused by alcohol evidently had persisted. The paralysis of the acusticus and facialis occurred after an attempt at strangulation, and the cause was believed to be hemorrhage from rupture of one of the small vasa auditiva interna. Some cases in the literature justify this diagnosis.

Peroneal Palsy. Paralysis of the peroneal nerve supply of each side in a woman caused by difficult labor has been observed by Nonne.[2] The xplanation given for this is as follows: the fibres forming the peroneal nerve arise from the fifth and a part of the fourth lumbar roots and lie within the pelvis without protection from muscle.

Stereognostic Perception. Loss of stereognostic perception in spinal root territory is not often seen, but Dejerine and Chiray[3] have reported a case of this kind. The objective and subjective disturbances of sensation were confined to the innervation of the eighth cervical and first thoracic roots, and paresis also was especially marked in this region. Stereognostic perception was lost in the ulnar half of the hand, and no object could be recognized when placed on the three last fingers of this hand, but it was recognized at once when put between the thumb and first finger.

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[1] Monatsschrift für Psychiatrie und Neurologie, January, 1905, No. 1, p. 29.

[2] Deutsche med. Wochenschrift, 1904, vol. ii. p. 1113.

[3] Revue neurologique, May 30, 1904, No. 10, p. 501.

Dejerine and Gauckler[1] believe they have shown by the study of a clinical case that a small lesion of the crossed pyramidal tract in the cervical region may cause a brachial monoplegia of root type, that is, a paralysis in the upper limb confined to the distribution of a nerve root.

Charcot-Marie Type of Muscular Atrophy. The occurrence of *optic atrophy* in the muscular atrophy of the type of Charcot-Marie is rare. Ballet and Rose[2] have observed a case, however, in which both optic nerves were atrophied, and they say they have been able to find only 2 similar cases reported. Alfred Gordon[3] reminds them that they have overlooked a case reported by him.

MISCELLANEOUS NERVOUS DISEASES.

Epilepsy. The statements regarding cures of epilepsy vary greatly. W. A. Turner[4] refers to this fact, and attributes the variations to the greater precision in diagnosis, the later authors excluding from their statistics all cases of epilepsy due to organic disease; to the definition of cure, the interpretation of the different writers differing widely. Many authors do not state their definitions of cure, and often so-called cures are merely long remissions occurring spontaneously or as the result of suitable treatment. Turner has made observations upon 516 cases, having excluded all cases which showed any coexisting complications, such as organic cerebral disease and all cases of idiocy and pronounced imbecility. Cases of so-called idiopathic epilepsy were, as far as possible, obtained; while any transitory amelioration resulting from medicinal or other treatment was checked by fixing the minimum period of observation at two years. Turner finds that sex plays little part in the general prognosis of epilepsy. Rather more males than females show arrest of the seizures, but the females give a greater percentage of confirmed cases. It seems that a larger percentage of women than of men escape the deteriorating influence of epilepsy upon the mind, but that when dementia supervenes and reaches its most pronounced form a somewhat higher percentage of women are affected. The most frequent mental condition in male epileptics seems to be a slight impairment of the memory and a blunting of the higher mental faculties.

Turner thinks there is as great a chance of arrest of epileptic fits in those who have, as in those who have not, a known family history of epilepsy. In those who have a hereditary history the chances as to whether the fits become arrested, improved, or confirmed are in any given case about equal. As regards general improvement, more is to be expected in those who have no hereditary disposition, while a considerably smaller percentage of confirmed epileptics is to be found among those who have no family predisposition to the disease. A family disposition to epilepsy or insanity exerts to a greater extent a deteriorating influence upon the mental condition of those who subsequently develop epileptic seizures. The general statement may be made that a family tendency to either epilepsy or insanity, though offering no obstacle to the arrest of the seizures in favorable cases, materially increases the likelihood of the disease becoming confirmed and the supervention of dementia.

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[1] Revue neurologique, March 30, 1905, No. 6, p. 313.

[2] Ibid., May 30, 1904, No. 10, p. 522.

[3] Ibid., 1904, p. 761.

[4] Boston Medical and Surgical Journal, February 16, 1905, p. 179.

Turner believes that epilepsy commencing under ten years of age is least favorable for arrest or improvement, and most favorable for the production of confirmed cases. In those in whom the disease commences during the period of puberty is to be found the greatest percentage of arrests and the lowest percentage of confirmed cases. The cases of epilepsy which commence between the twenty-first year and the thirty-fifth show a steady diminution in the percentage of arrests. After thirty-five there is a diminution in the number of confirmed cases, and senile epilepsy is a tractable disorder.

The earlier a case is systematically treated the better the prognosis. There is a greater prospect of arrest or improvement during the first five than during the second five years of the disease. Arrests of the fits may occur, even after a duration of from twenty to thirty years, although this is not the rule.

The longer the interval between the attacks, the greater the chances for arrest or improvement. There is a direct relationship between the frequency of the seizures and the degree of mental impairment. The more frequent the attacks the more common and profound the associated dementia.

The major attacks are more readily influenced by drugs than the minor seizures. The least favorable cases are those of petit mal occurring alone. Mental deterioration is found in association with both types of seizure, but it is less frequent in those cases in which grand mal is the main expression of the disease.

Long remissions may occur under bromide treatment, but the attacks may return after the omission of the drug, after a blow upon the head, childbirth, or an acute inflammatory disease. Turner thinks that long periods of arrest, though, as a rule, indicating a favorable prognosis, are not synonymous with the cure of the disease.

The question of cure is the most interesting one upon which Turner touches. He answers it in general terms in the affirmative. He thinks it is unsafe to regard as cured any case of epilepsy in which the seizures have been in abeyance for a period of less than nine years after the disease has become satisfactorily established. He has studied 147 cases that had been under observation for at least nine years; in 15 of these the attacks were arrested for nine or more years, giving a percentage of 10.2 cures. In a very small percentage of cases relapse occurs after an arrest of nine years. If any given case of epilepsy is capable of amelioration, a satisfactory response will be apparent within a short time of commencing treatment. Of the series of cases in which the disease was arrested, somewhat over 50 per cent. showed arrest within one year of treatment.

We could wish that Turner had given statistics regarding the methods of treatment of his cases.

Cholin in Epilepsy. Mott and Halliburton have found cholin in the blood and cerebrospinal fluid in cases of disease of the nervous system causing destruction of nervous tissue, especially in general paralysis of the insane and in tabes. They regard it as a product of lecithin, which results from degeneration of the medullary substance. Julius Donath[1] has made further studies on cholin in the cerebrospinal fluid obtained by lumbar puncture. He finds cholin, as a rule, in this fluid obtained from epileptics, and has been able to produce violent convulsions in animals by means of cholin, therefore he concludes that this substance plays an important part in epileptic convulsions. Cholin was present in 15 out of 18 cases of genuine epilepsy, and was found as frequently in cases of genuine, Jacksonian, or syphilitic epilepsy (19 times out of 22 cases) as in cases of organic disease of the central nervous system. Cholin was absent in 2 cases of hysteria, in 3 cases of hysteroepilepsy, and in 2 cases of neurasthenia. Donath found, when he injected cholin into the cerebral cortex, that it produced severe tonic and clonic convulsions, resulting even in paresis, and he believes that the epileptiform attacks in progressive paralysis are caused chiefly by cholin in association with increased irritability of the hyperæmic brain cortex, although other substances may also be of importance.

Focal Epilepsy. The Jacksonian form of epilepsy is usually indicative of a circumscribed lesion of the brain, but Leo Müller[2] has collected a number of cases in the literature, and reports some new observations to show that status hemiepilepticus may be a manifestation of idiopathic epilepsy and may cause a fatal termination. In these cases no lesions were found. We must acknowledge the correctness of his views, and yet, in a case in which repeated convulsions occur, always begin in, and are confined to, the same parts, in the absence of nephritis, I should be inclined to suggest operation. I have seen a brain tumor cause only this symptom, and it was removed by operation with most gratifying results. Status hemiepilepticus idiopathicus does occur, but, on the whole, we shall probably make fewer mistakes by operating in doubtful cases when this condition is present, and thereby may not overlook a tumor of the brain.

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[1] Deutsche Zeitschrift für Nervenheilkunde, Nos. 1 and 2, vol. xxvii. p. 71.

[2] Ibid., No. 1, vol. xxviii. p. 31.

EPILEPSY AND HYSTERIA. Paul Steffens[1] returns to the position he took in 1899—viz., that hysteria and epilepsy are not essentially different, but that the same disease appears in different form and different intensity. Pupillary rigidity and complete loss of consciousness may occur in the hysterical attack, whereas the reaction of the iris and consciousness may be preserved in the epileptic attack. In the interparoxysmal period of epilepsy temporary and even persisting disturbance of sensation and of the special senses may be observed. These and other arguments are presented to show the intimate relation of hysteria and epilepsy. Naturally these views have been severely criticized, and yet they are not more striking than Kraepelin's association of melancholia with mania.

NEURONAL IN EPILEPSY. Peter Rixen,[2] after studying the effect of neuronal in epilepsy, concludes that it quiets the epileptic excitement and is a valuable hypnotic. Usually 1 to 2 grains are sufficient, but when the excitement and motor unrest are greater 3 to 4 grains daily may be needed. Neuronal is valuable for the violent headache following the epileptic attacks and for the nervous disturbances of menstruation. Bad effects have not been observed.

Myokymia. Two cases of transitory myokymia, much alike, have been observed by Edsall.[3] The description of the condition in one patient is sufficient for both. There was constant fascicular contraction in the muscles of the feet, legs, thighs, abdomen, hands, and forearms, but they were most pronounced in the muscles of the calf. Contractions appeared synchronously in various portions of the calf muscles and continued with such energy and rapidity that they suggested the movements of a mass of very lively snakes. The movements caused frequent twitching of the fingers like a mild subsultus tendinum, but there was no displacement of the feet or toes. There was slight persistent spasms of the feet and hands resembling mild tetany. The mechanical irritability of the muscles was greatly exaggerated; moderately active palpation would bring on violent and exceedingly painful spasm, during which the muscles would become board-like in hardness. The spasm lasted fifteen or twenty seconds. Even a slight attempt at voluntary use of the muscles of the trunk or of the extremities would often bring on violent spasms, and on attempting to sit up in bed the muscles of the abdomen became very hard. An entirely spontaneous spasm was not observed. Active purgation caused a disappearance of the symptoms in each case within a few hours.

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[1] Archiv für Psychiatrie, No. 3, vol. xxxix. p. 1252.

[2] Münchener med. Wochenschrift, November 29, 1904, p. 2138.

[3] American Journal of the Medical Sciences, December, 1904, p. 1003.

Edsall thinks that the high atmospheric heat (July) or some digestive derangement produced by the heat disturbed the body chemistry in some obscure way. The patient had only a slight elevation of body temperature.

Chorea. Flaccid, symmetrical paralysis in one or two muscles occurring in diplegia, especially in the form characterized by choreiform movements, has been observed by Klempner,[1] and must be very uncommon. In one case the rhomboid muscles were paralyzed on each side, but all the other muscles of the body had normal power. The patient, a boy aged seven years, had had choreiform movements about three years. In another case the peroneal supply was paralyzed on each side, and the muscles in this distribution were flaccid. Choreiform movements had appeared at the time the child learned to walk. The explanation for these unusual cases is wanting. Poliomyelitis, neuritis, and residual palsy are unsatisfactory means of explaining the flaccid palsy.

In a case of extreme chorea, in a girl aged fifteen years, M. G. Tull[2] has obtained most gratifying results by the administration hypodermically of $\frac{1}{40}$ grain of *apomorphine*. A dose of $\frac{1}{20}$ grain by the mouth every three hours with arsenic was then ordered. At no time was there sign of nausea or vomiting. A steady gradual improvement occurred.

Hysteria. One might suppose that when hysteria causes a certain spasmodic movement lasting many years some change in the nerve centres would occur. A case affording an exceptional opportunity for a decision in this matter has been reported by S. Weir Mitchell and myself.[3] Mitchell first published a report of the case in 1876, and since that time the patient has been under his observation and many others. The man had a tremor, rhythmical in character, lasting with short periods of intermission until the time of his death. At one period the spasms were controlled by hypnotism. There could be little doubt that the condition was one of hysteria. I examined the nervous tissues obtained in the case and was unable to find any pathological alterations. Indeed, it would have been extraordinary if they had been found, inasmuch as the spasms had been entirely arrested for a time by means of hypnotism. There have been cases of other diseases with long-persisting involuntary movements and necropsy, such as the paramyoclonus of Friedreich, without distinct lesions. The case that we have reported permits the conclusion that the most typical hysteria lasting for years presents no representative organic lesion. It is supposable that more delicate methods may in the future reveal lesions, but in a condition in which symptoms may disappear so rapidly as they do in hysteria it seems improbable that lesions exist.

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[1] Neurologisches Centralblatt, March 16, 1905, No 6, p. 264.

[2] Proceedings of the Philadelphia County Medical Society, January 31, 1905, p. 69.

[3] Journal of Nervous and Mental Disease, October, 1904, p. 625.

HYSTERICAL VOMITING. A remarkable case of fecal vomiting in a hysterical female patient is reported by F. P. Weber.[1] Formed feces from the large intestine were vomited more than once. At times, when an oil enema was administered, some of the oil reappeared in the vomited matter. An enema colored with methylene blue was administered, and some of the methylene blue appeared in the vomited matter within ten minutes after the administration of the enema. Three laparotomies were performed, and even the stomach was opened and explored, and no abnormal condition was found. Weber refers to similar cases in literature and attempts to explain the condition. Active intestinal antiperistalsis, he thinks, is necessary for the occurrence of fecal vomiting of functional nervous origin, and vomiting of formed feces, in the absence of malingering and gastrocolic fistula, practically occurs only in functional nervous cases.

HYSTERICAL SPASM. Hysterical tonic spasm of the neck muscles may resemble very closely organic disease, as Knapp,[2] of Halle, points out, with a report of cases. The presence of hysterical stigmata elsewhere may aid in the diagnosis. A careful study is needed to exclude meningitis, tumor or abscess of the posterior cranial fossa, caries of the vertebræ, occipital neuralgia, rheumatism, and traumatic changes.

A peculiar form of spasm is described by C. Wernicke[3] and called by him cramp neurosis. Any energetic, quick, or unusual movement caused a spasm of the muscles of a greater or less part of the body, and the patient for a time was unable to move. The spasms were not as painful in the limbs as in the trunk, and caused much difficulty in breathing. They did not last more than a few minutes, often caused perspiration, and were followed by a sense of fatigue. Voluntary movements were very slow. The muscles of the head, throat, face, and tongue were never implicated. In other respects the patient seemed to be in good health. When he tried to grasp a hand the muscles of the whole limb and those of the thorax and shoulder were thrown into spasm. Passive movements, if of sufficient extent, caused the spasms. Wernicke says he has never seen a similar case nor found one reported. The condition resembled a little that seen in Thomsen's disease, but it differed from it in being acquired in adult life and in the absence of myotonic reaction In Thomsen's disease the movements are restrained only when they are first attempted, and later the patient can dance, jump, or run, but all this was impossible in Wernicke's case. A cause was not known.

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[1] Brain, Summer, 1904, vol. xxvii. p. 170.

[2] Archiv für Psychiatrie, No. 3, vol. xxxix. p. 1263.

[3] Berliner klin. Wochenschrift, October 24, 1903, No. 43.

HYSTERICAL PARALYSIS. A very uncommon case of hysteria is reported by Leyden.[1] A girl, aged sixteen years, became completely paralyzed in all four limbs shortly after a severe fright. The paralysis was flaccid, and sensation was lost in all the limbs. The muscles of the trunk at first were very weak, and retention of urine was present. Complete restoration of function was obtained rapidly by suggestive treatment. Leyden refers to a number of cases of organic and functional disturbances occurring after fright.

Raynaud's Disease. Hugo Strauss,[2] in a paper in which he reports two cases of Raynaud's disease, one with necropsy, states that in his opinion the symptoms of this disease are caused by spasms of the vessels, that they may be unilateral or bilateral, seldom are strictly symmetrical, and that therefore the name of "symmetrical gangrene" is not wisely chosen. He prefers to speak of angiospastic gangrene. The gangrene is the final result of malnutrition of the tissue and is produced by the spastic ischemia or the spastic cyanosis, although in the latter condition autointoxication from the products of metabolism assist in causing the gangrene. Raynaud's disease is not a trophoneurosis, in his opinion, but an angioneurosis, and may occur independently or with other diseases of the nervous system.

Acromegaly. The cause of acromegaly is unknown. Disease of the pituitary body has been supposed to stand in etiological relation, but, as has been shown repeatedly and recently by Kollarits,[3] a lesion of the pituitary body may exist without producing the symptoms of acromegaly. Kollarits has collected the reports of a number of such cases, and adds two of his own.

Facial Hemiatrophy. The progressive atrophy of one side of the face is difficult to understand. In the case reported by Loebl and Wiesel,[4] a woman, aged twenty-seven years, had trigeminal neuralgia soon followed by facial hemiatrophy. The symptoms began in the early part of the puerperium. Degeneration of the corresponding Gasserian ganglion and its peripheral branches was found, but not of the portion of the trigeminus central to the ganglion. The sympathetic did not appear to be diseased.

Graves' Disease. Jellinek[5] has observed brown pigmentation of the eyelids, especially of the upper, as an early sign of Graves' disease. It does not extend above the eyebrows. The pigmentation may become less intense in course of time, but rarely disappears.

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[1] Berliner klin. Wochenschrift, February 20 1905, p. 193.
[2] Archiv für Psychiatrie, No. 1, vol. xxxix. p. 109.
[3] Deutsche Zeitschrift für Nervenheilkunde, No. 1, vol. xxviii. p. 88
[4] Ibid., Nos. 5 and 6, vol. xxvii. p. 355.
[5] Semaine médicale, November 30, 1904, p. 391.

Sainton and Pisante[1] report much benefit in cases of Graves' disease from the administration of the blood and serum of sheep from which the thyroid gland had been removed. All the symptoms seem to diminish under the treatment. The ingestion is preferable to the subcutaneous injection and the serum more active than the blood. They give 5 to 10 drops as an average dose.

Paralysis Agitans. L. Bruns[2] has noticed increased flow of saliva in five cases of paralysis agitans, and it was not caused by any tremor of the jaw. Eight times he has observed tremor in the distribution of the facial nerve, usually in the chin. He has seen bulbar or pseudobulbar symptoms in paralysis agitans—viz., difficulty in swallowing and chewing and in the movements of the lips, tongue, and soft palate. In 3 cases he has seen excessive sweating, and in 2 cases atrophy of the interossei muscles, probably arthritic in origin. He has seen thickening of the fingers, such as occurs in acromegaly. In 7 cases severe pain was felt, usually as an early symptom. He points out that the diagnosis between multiple sclerosis and paralysis agitans may be difficult; indeed, the two diseases may be associated, just as tabes and paralysis agitans may be associated.

Now, the *parathyroid glands* are regarded as the source of many diseases that were thought to have some relation to the thyroid gland. The parathyroid glands were discovered by Sandström in 1880, but they received little attention until Gley, in 1891, showed that tetany could be produced in rabbits, provided the parathyroid glands as well as the thyroid gland were extirpated. Previously it had been supposed that tetany could not be produced in rabbits. In man the parathyroid glands are near the thyroid gland. H. Lundborg[3] reviews the literature on these glands, and shows that convulsions in children, tetany, certain cases of epilepsy, and eclampsia have been attributed to insufficiency of the parathyroid glands. Graves' disease also has been supposed to be dependent upon an abnormal condition of these glands, but Lundborg believes that the condition of the thyroid gland is more important in this relation. He thinks congenital myotonia and paralysis agitans may be dependent on imperfect development of the parathyroid glands, and that myasthenia gravis is the result of overfunction of these glands. Interesting as all this theorizing is, it must be stated the proof is wanting in Lundborg's paper.

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[1] Revue neurologique, November 30, 1904, p. 110.

[2] Neurologisches Centralblatt, November 1, 1904, p. 978.

[3] Deutsche Zeitschrift für Nervenheilkunde, Nos. 3 and 4, vol. xxvii. p. 217.

Muscular Dystrophy. Babinski[1] has observed true muscluar hypertrophy of the right upper limb following *typhoid fever.* He explains this in the following manner: During the typhoid fever myositis occurred, probably as a result of a vascular lesion, this caused marked alteration of the striated substance and paralysis; reparation followed and was excessive in certain muscles, and caused the formation of abnormally large muscle fibres.

A few cases in the literature show that the diagnosis between the muscular atrophy of spinal origin and the progressive muscular dystrophy may be extremely difficult. Dejerine and Thomas[2] have reported a case in which the muscular atrophy was confined to the distal parts of the upper limbs, and fibrillary tremors were seen. The condition had existed thirty-one years. At first the course was rapid, then was arrested, and finally became again progressive. Such a case as this might be well regarded as of spinal origin, but a microscopic examination showed that the nerves and spinal cord were normal.

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[1] Revue neurologique, December 30, 1904, p. 1181.

[2] Ibid., p. 1187.

OBSTETRICS.

By RICHARD C. NORRIS, M.D.

PREGNANCY.

The Heart and Circulation in Pregnancy. The recognized importance in recent years of the varied manifestations and pathological potentialities of the toxæmia of pregnancy have induced a few observers to review our knowledge of the cardiovascular changes induced by pregnancy. The relations of toxæmia—mild and grave—to the heart and circulation in pregnancy, and especially when cardiac disease antedates pregnancy, offer an interesting field for original work. I[1] have reported a few cases of fulminating toxæmia with violent cardiovascular symptoms, conditions which must be very rare. The less apparent and more insidious relations between vascular changes and kidney and liver functions induced by a mild toxæmia are worthy of careful study.

Nicholson[2] states that the study of the influence of normal pregnancy upon the maternal cardiovascular system has been pursued at intervals since 1825, when Larcher began his investigations in the Paris Maternity Hospital. He made 130 autopsies on women, the greater number of whom had died of puerperal fever, no lesion having preceded or given rise to the condition of the heart found in them. He did not weigh or measure the hearts, but seems to have merely formed the impression that the walls of the left ventricle were considerably thickened by at least from one-fourth to one-third; that the muscle structure was more firm, and the color more bright. He thought that the right auricle and ventricle retained their normal thickness. Comparing his observations with the figures given by Laennec for the normal heart, he assumed that the heart became markedly hypertrophied in pregnancy.

Later, his conclusions seemed to receive confirmation from the work carried out by Ducrest, who measured the hearts of 100 puerperal women and found even his minimum greater than Bizot's figures for the normal heart. Since then many investigators have added important contributions to the scientific study of this question. Yet the question whether the heart does or does not undergo hypertrophy during pregnancy is far from being definitely settled. Unfortunately the evidence derived from the standard methods of weighing and measuring the heart, its walls and cavities, and also from the results of physical examination of the organ, is unreliable. With regard to the physical examination of the heart in pregnancy, it is evident that an increase in the cardiac dulness with displacement of the apex beat cannot be accepted as proof that hypertrophy has occurred. Recently Stengel and Stanton have made a study of the heart in and after pregnancy and have thrown fresh light upon this matter. Their observations were entirely clinical and consisted of physical examinations before and after labor, with determinations of blood pressure and sphygmograms. Their study was very complete and painstaking, and their conclusion was that there is no hypertrophy of the left ventricle nor any special increase in its work during pregnancy. The increase in dulness toward the left is, in their opinion, explained by the fact that the diaphragm is lifted up, consequently the heart is displaced in an upward and outward direction. The comparative outlines showed that there is a rapid return to the normal position of the cardiac dulness after labor. They also noted frequently an increase in the extension of dulness toward the left in the second and third interspaces, in which area marked pulsation was often present. A systolic murmur was also sometimes heard over this area, and the lung substance did not seem to be displaced; their conclusion was that this state of things can be explained by a distention of the conus arteriosus and root of the pulmonary artery. They believe that during the latter months of pregnancy some continuous dilatation of the right ventricle does occur, and ascribe it to the upward displacement of the diaphragm and to pressure upon the lungs increasing the difficulties of the pulmonary circulation. Notwithstanding that many are not convinced that the left ventricle undergoes hypertrophy during pregnancy, Nicholson thinks that the evidence, both anatomical and clinical, is in favor of some hypertrophy. The extent to which it occurs is dependent upon a great variety of factors. Considering that in the course of a few months of pregnancy the uterine muscle undergoes enormous hypertrophy, and there is also greatly increased growth of glandular structures of the body, he believes it would be somewhat remarkable if the heart did not likewise pass through an hypertrophic evolution. It is known that the uterine functions are intimately connected with the organs of circulation, as is instanced by certain disturbances of the heart arising sympathetically from morbid conditions of the uterus. And if we bear in mind the well-established relationship between disease of the kidneys and hypertrophy of the left ventricle, there is suggested the question whether certain renal disorders dependent on pregnancy—quite apart from the so-called "pregnancy kidney"—may not exert some direct influence upon the heart. When Bright's disease develops during pregnancy, the cardiovascular changes associated with it are well marked; but apart from actual disease the strain of pregnancy falls chiefly upon the kidneys, and, perhaps, their temporary failure in function is a factor that calls forth a certain amount of cardiac hypertrophy.

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[1] American Journal of Obstetrics, 1903, No. 1, vol. xlviii.

[2] Journal of Obstetrics and Gynecology of the British Empire, January, 1905.

A heart which has undergone hypertrophy should be able to perform additional work without overstrain. Certain established facts, however, seem to point to a distinct inefficiency. In these cases, although the rate and character of the radial pulse often point strongly to the fact that the left ventricle is endowed with increased activity, one cannot consider the hypertrophy compensatory in the sense that the woman is enabled to exert herself with the same freedom she possessed before pregnancy. Mackenzie has clearly shown that quite early in pregnancy the cavities of the right heart dilate. Nicholson has previously called attention to this paradoxical state of affairs in connection with the heart of pregnancy —a slow, full, radial pulse, quite consistent with a left ventricular hypertrophy, in combination with a large pulsation in the jugular veins, giving infallible evidence of dilatation of the right side of the heart.

In trying to determine the cause of this condition of circulatory phenomena, he cites the argument advanced by Allbutt in support of the toxic theory of puerperal albuminuria. He suggests that in pregnancy there is retained in the system some material which causes a widespread constriction of the arterioles. It is pointed out that in the toxæmia of lead poisoning extreme vasoconstriction occurs, and that many of the symptoms of this condition are remarkably similar to those which develop when the chronic renal disease of pregnancy is present and pre-eclamptic symptoms make their appearance. This theory would provide a reasonable explanation of the circulatory changes referred to, especially if the alterations thereby brought about in the systemic circulation should tend to produce an engorgement of the pulmonary vessels, and, hence, a great increase of venous pressure. This view would seem to make it clear why the left ventricle should undergo some hypertrophy and also to explain the significance of the dilatation of the right heart. The origin of this constrictor substance is not known, but it is supposed that it may, like lead, be introduced into the body from without. In whatever way it gains entrance into the blood it seems to act upon the arteries and arterioles, and probably upon the heart, in a manner very similar to suprarenal extract, or to digitalis in toxic doses. Recent experimental work on the action of adrenalin upon the vascular system lends support to the view that the suprarenal secretion itself is the vasoconstricting principle, and that for some obscure reason it exerts an exaggerated influence upon the cardiovascular system in pregnancy. This work also throws additional light upon some of the hitherto inexplicable circulatory phenomena—dilatation of the right heart, overfilling of the veins, tendency to œdema of the lungs—which have been observed to occur at the very commencement of pregnancy, long before the addition of the placental circulation to the field of work supplied by the maternal heart can possibly act as a cause. It is possible that these observations may give the clue to the mode of production of some of the well-known phenomena associated with the renal diseases of pregnancy, and may even help to solve the riddle of puerperal eclampsia itself.

Brodie has shown that the effect of adrenalin upon the pulmonary blood pressure is to raise it to nearly double its original value, this rise commencing with and lasting longer than the rise in aortic pressure.

These effects he believes are mainly due to the action of the peripheral bloodvessels in causing the large rise in aortic pressure.

The adrenalin apparently acts upon the bloodvessels through the vasomotor nervous system, as an injection of the drug directly into the systemic vessels caused an immediate contraction, amounting almost to complete closure; while, on the other hand, direct injection into the pulmonary vessels resulted in a remarkably increased rate of flow—an exactly opposite effect. The conclusion from this result is that there are no vasoconstrictor fibres to the pulmonary vessels.

Drummond has studied, histologically, the changes produced by the injection of adrenalin on the glandular organs of the rabbit. Adrenalin produces great congestion of the viscera. These changes may be partly explained by the alteration in the blood pressure; they are also due to a toxic action of the drug. The most suggestive and important fact is that death is due to an acute œdema of the lungs, which is often accompanied by great congestion of these organs. Drummond ascribes these inflammatory changes in the lungs to the toxic influence of adrenalin. This influence is most distinctly seen in the liver and kidneys; upon these organs adrenalin seems to act as a protoplasmic poison. The changes in the liver cells are very similar to those which have been described in other toxic conditions, such as eclampsia. All these points are highly suggestive in relation to the maternal circulation in pregnancy, and also to the toxæmia which sometimes accompanies this state. The toxic influence of the active principle of the suprarenal secretion, while causing constriction of all the systemic arteries and arterioles, acts in exactly the opposite manner upon the pulmonary vessels, with the result that they tend to become engorged with blood. Under its action the whole venous system becomes overfilled and the cavities of the right heart become dilated.

Mackenzie has noted the following series of changes affecting the circulation, which, though in one sense abnormal, may in another sense be considered as incidental to the pregnant state. (1) A limitation of the field of cardiac response, generally shown by shortness of breath or attacks of palpitation on such exertion as the individual was wont to perform with the greatest comfort. It may be observed from the earliest period of pregnancy and long before the bulk of the uterine contents calls for an appreciably increased supply of blood, or for greater force of the heart's action; that is to say, the heart is not as efficient as before.

2. Changes in the rate and rhythm of the heart: the rate of the heart is frequently increased in early pregnancy, and palpitation follows more readily upon slight exertion. Changes of position, as from lying down to standing up, produce a more marked increase in the pulse rate than occurs in the non-pregnant state.

3. Dilatation of the right side of the heart: the increase of cardiac dulness is partly explained by the fact that the heart is pushed upward, but it is also due to dilatation of the cavities of the right auricle and ventricle.

4. Tendency to œdema of the lungs: as the pulmonary circulation is maintained chiefly by the right ventricle aided by the respiratory movements, the diminished expansion of the chest in the later months of pregnancy tends to make it more difficult for the ventricle to force the blood through the lungs. When the patient lies for several hours with the ribs pressed against the bed so that little movement of the chest is possible, the respiration is carried on mainly in the upper part of the chest, and is more shallow. On this account the blood is apt to become stagnant at the bases, and if we examine a pregnant woman toward the end of term we shall find, at the bases of the lung behind, on the side upon which she lay, numerous fine crepitations with the first deep inspiration. These crepitations constitute the first sign of the beginning of œdema of the lungs. The crepitations may disappear in the first instance after a deep inspiration, later they do not disappear, and frequently the conditions gradually advance until there are dulness on percussion and absence of breath sounds, and at postmortem examination the lungs are found engorged and sodden with dark blood. In normal pregnancy the condition rarely goes beyond the first stage, but the author insists upon it as another sign of the nature of the circulatory changes caused by pregnancy.

5. Tendency to overfilling of the veins of the leg: mechanical pressure will not serve to explain the various venous engorgements which occur in pregnancy, and which can sometimes be demonstrated very shortly after conception. The circulatory changes and vasomotor phenomena already discussed point strongly to the view that some powerful constrictor of the arterioles is responsible for the rise of pressure in the veins.

6. The occurrence of marked pulsation in the veins of the neck:

Mackenzie regards it not as an abnormal sign, but merely as evidence that the right side of the heart is dilated. Clinically this is the most important of all the symptoms that arise in connection with the circulation in pregnancy, for from its study we are able to recognize certain changes that take place in the right side of the heart. As a means of interpreting certain changes in the heart's action during pregnancy, in relation to the question of prognosis where mitral disease is present, this symptom of venous pulsation is of the greatest value. The venous pulse as it occurs in normal pregnant women is best observed in the recumbent position. As a rule, the pulsation is confined to the internal jugular vein, and as the carotid artery beats in the same situation the pulse in the vein is often mistaken for the beating of the carotid. The first part of the venous pulse, due to the systole of the auricle, occurs earlier than the carotid pulse; the collapse of the veins is synchronous with the arterial pulse. Mackenzie has framed the following rules as a result of his investigations of the various phenomena arising out of the dilatation of the right side of the heart. It is his belief that they form some sure ground upon which the practitioner may base his treatment.

1. When there is distinct evidence of failure of compensation, as evidenced by dropsy, enlarged liver, etc., or when the patient is liable to frequent attacks of failure of compensation, pregnancy should be forbidden.
2. With fair compensation, if there should be paralysis of the auricle, as evidenced by the presence of a diastolic murmur and the absence of a presystolic murmur, or of a continued irregularity of the pulse, or of a jugular pulse of the ventricular type, pregnancy should be forbidden.
3. With fair compensation, with a mitral murmur systolic or presystolic in time, with the apex beat within the nipple line, and due to the left ventricle, the patient may undertake the burden of pregnancy.

Patients having valvular disease should be kept under close observation after conception has occurred. The presence or absence of œdema of the lungs is an important prognostic symptom.

The Blood in Pregnancy. Although the subject of the constitution of the blood during pregnancy has been given a great deal of attention and investigation, the results attained even by the more modern methods have not been uniform. This fact has led Thompson[1] to endeavor to clear away some of the doubtful points. His observations were made upon 12 patients, and each patient was examined once a month from the time she came under observation; 2 cases came under observation at the second month, 2 at the third, 4 at the fourth, 3 at the fifth, 1 at the sixth. The women were all of the poor class, but were living under practically the same hygienic and dietary conditions. They had no constitutional disease or special pathological affection. Four of the cases were followed throughout their pregnancy and subsequent delivery, while the remaining cases are still under observation. The monthly examination of each case included (1) enumeration of red blood corpuscles, (2) estimation of the percentage of hæmoglobin, (3) count of leukocytes, (4) differentiation of leukocytes, (5) determination of the specific gravity of the total blood content. The series comprises 33 separate blood examinations, each examination including 5 parts, or a total of 165 various estimations.

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[1] Johns Hopkins Hospital Bulletin, June, 1904.

CONCLUSIONS. (1) A moderate decrease is observed in red-blood corpuscles rather early in pregnancy, remaining subnormal throughout the middle month to rise again to normal at the end of pregnancy. This, however, is not true in all cases. (2) There is a low percentage of hæmoglobin which is constant throughout the first seven months and rapidly approaches normal as pregnancy draws to a close. (3) A slight absolute leukocytosis exists in every case of pregnancy, but this slight leukocytosis does not support the theory that it is due to any positive chemotaxis. (4) There is no variation from normal in the different forms of colorless corpuscles, the leukocytosis affecting all forms of white cells alike. (5) The specific gravity is high at the outset of pregnancy, diminishing by progressive steps, to reach its lowest level in the middle months, and rising to normal at term.

Venous Dilatations in the Gravid Uterus and Their Clinical Importance. Great dilatation of the bloodvessels of the pregnant uterus is so rare that only a few cases have been found in the literature on the subject. Kaufmann has reported two cases. The present case is reported by Halban.[1] The patient, aged twenty-six years, was in her first pregnancy; she menstruated last May 3, 1903. At the beginning of June a slightly blood-stained discharge appeared. It lasted for eight days and afterward became purulent. During this time the patient had pains in the back and breasts, and a slight rise of temperature. Severe hemorrhages developed later and she was admitted to the hospital July 26th. Upon examination she appeared to be pregnant about three months. With rest in bed the bleeding soon ceased and she was allowed to leave the hospital. She was readmitted later with severe hemorrhages, when it was decided to empty the uterus. The cervix was dilated under ether anæsthesia with Hegar's dilator and the embryo and membranes were removed with ovum forceps. It was discovered that in the operation a small piece of the uterine wall was brought away in the bite of the forceps; a careful examination revealed a perforation of the uterus about three fingers' breadth above the internal os. The uterus was accordingly removed per vaginam and three serious lesions were found, two in the cervix and the one above mentioned. Recovery was uneventful. On cutting open the uterus along the anterior wall the musculature presented the appearance of a sponge on account of the great dilatation of thin-walled vessels varying in size from a pin's head to that of a pea, with the muscle wall between them as thin as paper. These vessels were evidently veins and capillaries greatly dilated, whose walls almost touched one another on account of the great thinning out of the muscle substance between. The outer and inner groups of vessels seemed to be most affected. Kaufmann's cases occurred, one in a thirty-year-old primipara, and the other in a widow of forty-one, non-pregnant.

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[1] Monats. f. Geburts. und Gynäkol., Bd. xx., Heft 3.

Three explanations seem to offer themselves in these cases: One, that it is a nævoid formation in a non-pregnant uterus, in the same way that angioma occurs in the liver. Secondly, venous dilatations of the non-pregnant uterus from back pressure. This was apparently the explanation in the second case reported by Kaufmann. Thirdly, varicosities in the pregnant uterus from hypertrophy of the veins, as in Kaufmann's first case and in the present case.

The author believes that a specific change in the vessels due to pregnancy is the cause of this curious condition, and that varicosities result from thinning of the vessel walls instead of hypertrophy. The varicose veins of the vulva, legs, and abdomen, so often seen in pregnancy may be caused in this way, too, for they cannot be explained on the pressure hypothesis. The dangers in the case are the great liability to hemorrhage, and also the liability to laceration if any operative procedure has to be undertaken. Both of these possibilities were exemplified in the present case.

Hyperemesis Gravidarum. The investigations and discussions of the subject of the excessive vomiting of pregnancy have not yet made the etiology of the disease clear. In this connection a review of several papers upon this subject which have appeared[1] will prove interesting. Graefe discusses Boehm's theory as to its causation, namely, the *syncytial intoxication* theory. This view is that the simple vomiting of pregnancy becomes excessive from the third to the fifth month, because at this period there is a considerable degeneration of chorionic villi, which take no part in the formation of the placenta, and that as a result of this degeneration the syncytial remnants enter the blood stream and there exert a toxic effect. This intoxication produces a species of immunity in the patient which leads Boehm to suggest that this is the explanation of the fact that multiparous women are not so likely to suffer from excessive vomiting.

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[1] Monats. f. Geburts. und Gynäkol., July, 1904, Bd. xx., Heft 1.

Three categories of cases can be noted, however, in which Boehm agrees that this view will not hold: (1) those in which vomiting begins in the second half of pregnancy; (2) those in which vomiting continues after abortion; (3) those in which the vomiting ceases after abortion and in which the patients die. In the first and second groups the author suggests diseases of the brain, kidneys, liver, alimentary canal, etc., as causes of the vomiting. In those cases of the third group which die, he believes death to be due to such a large amount of cell destruction by the syncytial toxin that recovery is impossible. Two cases reported by Pick have a direct bearing upon this statement: one died of a septic endometritis after abortion, and the other of a diphtheritic endometritis. In such cases only a postmortem examination can reveal the true cause of death, and it is probable that the excessive vomiting had nothing to do with the death in either of these cases. Another cause of vomiting may be the retention of conception products, where, after abortion, the vomiting does not cease until the retained tissues have been removed. The author is not convinced by Boehm's views, and asks: If one believes that hysteria may be a real cause of excessive vomiting of pregnancy, how could a purely psychical mode of treatment cure it if a syncytial intoxication were the cause? Kaltenbach, who is the great exponent of the view that *hysteria* is the prime cause of excessive vomiting, assumes that hysteria is a true functional neurosis, which, by increasing the reflex excitability of the vomiting centre, causes hyperemesis. And, further, that the cure of hyperemesis by psychical or physical treatment is brought about in the same way as the cure of an hysterical paralysis or contracture.

If the usual stigmata of hysteria be present the diagnosis is easy, but hysteria may be present even if they are not found. The author agrees with Kaltenbach, and he places great importance upon the fact that many primagravida have read of excessive vomiting, and that an unwelcome conception may really be the underlying cause of a functional neurosis. Numerous cases are quoted as upholding this theory, among them the two above mentioned which ended fatally, and the one in which the removal of placental remains was followed by cure. This latter case the author believes favors Kaltenbach's view, for this reason: the patient still believed herself pregnant after her incomplete abortion, and it was not until she was convinced by the removal of placental remains that she was no longer pregnant that the vomiting ceased. The removal of the placental remains acted by suggestion and not as by the removal of a toxic substance. The other cases were treated by rest in bed, milk diet, and removal from friends.

Zaborsky discusses hyperemesis from other points of view and distinguishes those cases which have some obvious lesion of the generative or other tract which could reflexly cause vomiting, and those in which apparently no lesion of any kind exists. No special hypothesis is necessary to explain hyperemesis when lesions exist, for a pregnant woman has simple vomiting as a general rule, and any existing lesion will make it worse. Where no obvious lesion exists the views of Fischel, Lindeman, Dirmoser, Clivio, and Boehm may be considered with advantage. All these writers, with the exception of Boehm, regard hyperemesis as a manifestation of autointoxication, either miasmatic or having its origin in the alimentary canal. Dirmoser takes this view for several reasons: (1) the appearance is that of a serious disease with great weakness, rising pulse, fever and jaundice; (2) urinary analysis gives evidence of decomposition of bowel contents, such as indol, skatol, albumin, and kidney elements; (3) the postmortem appearances are those of parenchymatous degeneration of liver, kidneys, etc., such as is found in other conditions of toxæmia. Zaborsky, however, believes that it is just as simple to explain these cases as reflex vomiting from the pressure of scybala or a distended bladder on the uterus, and that the washing out of the tract as recommended by Dirmoses and others cures the case by removing pressure. Hence, he does not believe that the majority, at all events, are cases of autointoxication. Vomiting tends to cease as the uterus rises out of the pelvis; if, however, it does not cease at that time, autointoxication from whatever source may play an important part.

Baisch in his paper considers both hyperemesis and salivation in pregnancy. He reviews the various theories which have been advanced under the headings: (1) obvious diseases of organs leading to excessive vomiting, such as rigidity of cervix, erosion, endometritis, displacements of the uterus, liver, kidney, stomach and blood and brain diseases; (2) intoxication from alimentary canal, from lack of salt in food, and from the developing embryo; (3) reflex neurosis of the stomach starting from uterus or intestine, or an increased reflex irritability; (4) bacterial infection. If the treatment of an obvious lesion cures hyperemesis, then that lesion must be looked upon as the cause, and so the first group may be looked upon as obvious causes. But only a small percentage of the cases fall in this group. Of the other groups the author looks upon the reflex neuroses and reflex increased irritability as the most likely. Two important points must be considered in connection with this theory: (1) that hyperemesis is directly concerned with the embedding of the embryo in the wall of the uterus and ceases when the union thus formed is broken after abortion; (2) the gradual increase of simple vomiting until it becomes excessive. No hard and fast line can be drawn between these two conditions. On these considerations he believes that it must be allowed that the irritation which reflexly causes vomiting must arise from the growing embryo itself. This is understood when one considers the whole effect of the embryo on the maternal organism—*e. g.*, the growth of breast tissue and the milk secretion. These reflex influences also affect the centres for the digestive organs, as is observed in the ravenous hunger which sometimes is present as a result of pregnancy.

Pregnancy is a physiological condition and most women are able to meet the demands of it; but if there be any insufficiency, the reflex disturbances will produce such an irritation of centres that excessixe vomiting perhaps results. As to the nature of the irritation which causes this reflex excitability, we must consider its source in the uterus, its effects on the medullary centres, and its effect on the periphery of the reflex arc, namely, the stomach. From these points, too, the treatment may be established. Artificial abortion is indicated when the uterus is at fault, narcotics and suggestion when the cause lies in the nerve centres, and dietetic measures when the chief failure is in the performance of the stomach functions. The chief difficulty is to decide when abortion should be produced. The danger of putting it off until too late is very great, but if loss of weight, prolonged fever, albuminuria, pulse frequency, diazo reaction, etc., are carefully considered, there should be less difficulty in this direction when diet, suggestion, local treatment of uterus, etc., fail. Excessive salivation in connection with hyperemesis adds to the seriousness of the condition, and there seems little doubt that the same reflex excitability of nerve centres and reflex irritations may give rise to both conditions.[1]

Williams[2] believes that the evidence we have at present justifies us in dividing the cases of serious vomiting of pregnancy into the following groups: (1) reflex; (2) neurotic; (3) toxæmic. Reflex vomiting in pregnancy may occur from abnormalities of the genital tract or ovum which existed prior to the onset of pregnancy or are coincident with it, such as (*a*) displacements of the uterus, particularly retroflexions; (*b*) ovarian tumors; (*c*) certain cases of endometritis; (*d*) abnormalities of the ovum, such as hydatidiform mole, hydramnios, and certain cases of twin pregnancy. The abnormal conditions of the cervix, so frequently mentioned in the literature, should not be considered as factors in the causation of reflex vomiting, since it is probable that the occasional cures following their treatment are only striking examples of the curative effect of suggestion. Many writers have contended that most, if not all, cases of vomiting of pregnancy are neurotic in origin and more or less closely allied to hysteria, and were amenable to suggestive treatment. Williams considers this view too extreme, but nevertheless believes that it holds good for many cases. This variety of vomiting should be diagnosed only after excluding organic lesions and demonstrating the absence of toxæmia by a most thorough examination of the urine. Toxæmic vomiting was, according to Williams, first suggested by Fischel in 1884. In his case the toxæmic nature of the condition was attributed to the absorption of toxic materials from the impacted large intestine. During the past ten years the toxic theory of the vomiting of pregnancy has commanded a more and more prominent position, and all sorts of theories concerning the origin and nature of the toxic material have been advanced. Among them are (*a*) secretion of corpus luteum; (*b*) secretion of ovary; (*c*) absorption from intestines; (*d*) hepatotoxæmia (Pinard and Bouffe de St. Blaise); (*e*) invasion of the maternal organism by fetal elements, the syncytiotoxin theory of Veit, Boehm and others; (*f*) its identity with eclampsia on the one hand and acute yellow atrophy of the liver on the other (Champetier de Ribes and Bouffe de St. Blaise, Stone, Ewing, and Edgar). From his own experience as well as that of Stone and Ewing, Williams feels no hesitation in saying that in at least a certain proportion of the toxæmic cases of vomiting of pregnancy characteristic lesions may be found at autopsy, and are identical with those observed in acute yellow atrophy and icterus gravis.

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[1] Journal of Obstetrics and Gynecology of the British Empire, August, 1904.

[2] Surgery, Gynecology, and Obstetrics, July, 1905.

These consist in the degeneration and necrosis of the central portions of the liver lobules and the fatty degeneration and necrosis of the secretory portions of the kidneys, and can only be explained on the assumption that some powerfully toxic substance is circulating in the blood. At present we are absolutely ignorant as to the exact nature of this toxic substance or substances, though in the present state of our knowledge it would seem most natural to suppose that they are metabolic in origin and are directly connected with pregnancy, though whether derived from the mother or fœtus or both is not known. All that we can state definitely at this time is that in some cases of pernicious vomiting we have to deal with a toxæmia which gives rise to serious lesions in the liver and later in the kidneys, and that the latter are secondary in character, as is indicated by the fact that the urine does not contain albumin until shortly before death. Associated with these lesions is a striking change in metabolism, which is manifested by a marked increase in the percentage of nitrogen put out as ammonia compared with the total nitrogen of the urine, so that the former instead of being 3 to 5 per cent. as normal, may rise to 16, 32, or even 46 per cent., as in several of the cases. The practical outcome of this condition in the writer's experience is that a marked increase in the ammonia coefficient in women suffering from pernicious vomiting indicates the existence of a serious toxæmia, which, if allowed to continue, will be found to be accompanied by lesions of the liver and other organs inconsistent with life.

Under such circumstances abortion should be induced as soon as the condition is detected, as it offers the only hope of checking the toxæmia and saving the life of the patient. His experience will not justify him in laying down definite rules as to how great an elevation in the ammonia coefficient is consistent with the safe continuance of pregnancy. But until further experience demonstrates to the contrary, it would seem safe to assume that an ammonia coefficient of 10 per cent. represents the danger signal, and immediate interference is demanded as soon as it is reached. In the reflex and neurotic forms of vomiting the ammonia output remains normal, and thus not only affords a means of diagnosis between the neurotic and toxæmic varieties of vomiting, but is a most valuable guide as to treatment.

The writer agrees with Stone and Ewing as to the anatomical lesions found in certain cases of vomiting of pregnancy, but takes sharp issue with them when they contend that the toxæmic vomiting, acute yellow atrophy, and eclampsia are manifestations of one and the same toxæmia. His experience teaches him that there are at least two toxæmias of pregnancy, and probably more—one giving rise to the vomiting of pregnancy and acute yellow atrophy, and the other to eclampsia. In both necrotic lesions occur in the liver, but differ totally in character in the two diseases and need to be seen only once to be appreciated. In eclampsia the lesions begin in the portal spaces and invade the lobule from the periphery toward the centre; while in the vomiting of pregnancy the necrosis begins in the centre of the lobule and spreads peripherally and never involves the portal spaces. In most cases of eclampsia and pre-eclamptic toxæmia there are marked signs of involvement of the kidneys and general circulation—as manifested by scanty urine in proportion to the intake of fluid, the early appearance of pronounced albuminuria, and the presence of casts and œdema.

In vomiting, on the other hand, the urinary output is diminished only as the intake of fluids is interfered with, and albumin and casts are present only in the last days or hours of life, while œdema is absent.

Chemical examination of the urine shows in eclampsia the total amount of nitrogen greatly diminished, while the ammonia coefficient remains practically normal. In vomiting, on the contrary, in spite of the scanty amount of urine, the amount of total nitrogen remains approximately normal, while the ammonia coefficient is wonderfully elevated.

Generally speaking he regards a high ammonia output as a favorable prognostic sign in eclampsia, and a very ominous one in vomiting.

The above discussion indicates the necessity for determining by careful study the type of case one has before beginning treatment Local pelvic disorders, such as uterine displacements, cervical inflammation, or rectal impaction having been corrected, the gastrointestinal tract routinely should receive treatment, and of all means at our disposal daily lavage of the colon with two or more quarts of salt solution will be found most valuable. The frequency of fecal concretions and mucous accumulations in this disease are astonishing. Calomel and salines are further aids in elimination. Appropriate diet, and, what is of very great value in the successful handling of these cases, the gaining of moral control of the patient are necessary. Patients with unmistakable hysterical symptoms should always be isolated and subjected to a modified rest treatment in which hydrotherapeutics are profitably employed. A temperature record, repeated examinations of the blood and the vomited material, stomach lavage, critical examinations of the urine, and of the cardiovascular system help to an intelligent decision as to the necessity for terminating pregnancy. Estimation of the ammonia output, according to Williams, should be an efficient guide. Its practical value should be confirmed by further investigation.

Changes in the Nose and Pharyngeal Space in Pregnant, Parturient, and Lying-in Women. The recent work on the coexistence of nasal lesions and dysmenorrhœa, and the cure of the latter by the treatment of the former, has led Freund[1] to investigate the condition of the nose and throat in a large number of pregnant women at different periods. From his study of the cases and a careful consideration of the lesions found, he has drawn the following conclusions:

1. There are physiological relations between the female sexual organs and the nose.

2. These relations made themselves clear in pregnant women, for out of 100 women examined 66 had hyperæmia of the pharyngeal mucous membrane and hypertrophy of the turbinated bones, especially the lower, more seldom the middle.

3. The pregnancy changes in the nose are not periodical as has been suggested, but are continuous, and clinically show themselves by epistaxis in 25 per cent. of the cases.

4. These changes are induced especially by the circulatory apparatus.

5. During the labor pains there is a considerable swelling of the turbinated bones, a physiological phenomenon started reflexly by the respiratory organs.

6. The nasal pregnancy disturbances often remain during the puerperium, and suckling has no influence upon them.

7. In certain women reflex hyperemesis gravidarum can be started from the swelling of the turbinated bones and septum, and treatment of them by the galvanocautery cures the vomiting.

8. More seldom the pharynx shows hyperæmia and hypertrophy of the mucous membrane and tonsils during pregnancy.[2]

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[1] Monats. f. Geburts. und Gynäkol., Bd. xx., Heft 3.

[2] Journal of Obstetrics and Gynecology of the British Empire, November, 1904.

Albuminuria and Pregnancy. The frequency of albuminuria in pregnancy has varied, according to different investigators, from 6 to 50 per cent. The different results obtained are doubtless due to several factors, such as care and accuracy of observation, the character of the test employed, the period of pregnancy, and the race and habits of life of the patients, especially as related to diet, exercise, and constipation. I have long ago discovered in my hospital routine examinations that the frequency of albuminuria falls abruptly after the change in diet and daily administration of laxatives to which all our patients are subjected. In the last 100 consecutive cases at the Preston Retreat, the examinations made at ten-day intervals for each patient albumin has been found, by the nitric acid contact method, in only 8 per cent. of the cases. When albumin is detected, heat and nitric acid are also employed, and for volumetric estimate picric acid with gravity or centrifugation are used. As examples of the different results obtained by two observers, I have placed in contrast the work of Stewart and of Little.

In an attempt to throw further light upon the problems of the relationship of pregnancy and labor to kidney changes and to eclampsia Stewart[1] reports the following cases. In the same publication, No. 21, 1903, the writer reported the results of 442 examinations of the urine of 85 pregnant women as follows:

Month	2	3	4	5	6	7	8	9
Number of examinations	9	17	20	43	44	69	71	168
Albumin found	0	0	1	0	1	3	1	7
Percentage	0	0	5	0	2.3	4.3	1.8	4.1

Albumin was found in 13 cases, or 15.3 per cent. In 72 cases no trace at any time was found, a result of 84.7 per cent. Albumin occurred oftener in the ninth month than in all the others combined, but the difference was only relative, arising from the greater number of examinations. In 11 cases the albumin disappeared, and in 1, in which casts appeared, even these disappeared under medical treatment. Albuminuria persisted in 1 case.

He reports that the characteristic feature of the treatment in these cases is: a simple flushing out of the bowels, and incidentally the kidneys, which restores to the normal what might have proved to be a serious pathological lesion in the pregnant woman. This, he believes, goes a long way in proof of the falsity of the theory that pregnancy produces a persistent and increasing tendency to the production or retention of poisonous materials in the mother's system. This view he believes to be strengthened by the fact that in the cases reported there was no return of the symptoms after they had been once removed, and particularly by the fact that 84.7 per cent. pregnant women showed no albuminuria. A report of 5 cases treated subsequently to the series discussed above is presented with an analysis. All showed evidences of the nephritis of pregnancy, and in no case was there evidence of a diathesis such as syphilis, rheumatism, malaria, tuberculosis, or chronic Bright's disease.

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[1] American Journal of Obstetrics and Diseases of Women, January, 1905.

There was nothing apparent in any of the cases, aside from the pregnancy, to account for the kidney disturbances. In 4 of the cases there was at no time any deviation from the normal as regards the kidneys until within the week preceding the delivery; in 1 the nephritis appeared at the first catheterization after labor; 3 were under the writer's care and 2 under the care of a competent physician for months before delivery. In 4 cases there was, after the appearance of albumin, a marked increase in the quantity thereof and then the appearance of casts, leukocytes, etc., in increasing quantities before delivery, and a very decided increase in all these constituents immediately after confinement. In 2 cases there was marked diminution in the quantity of the urine: twelve and twenty-four ounces, respectively, in twenty-four hours.

The characteristics of Cases II., III., IV., and V. of this second series, is that the treatment which had been so successful in the former series was of no avail in them. The next characteristic of all cases except III. is that the ending of the pregnancy was followed in a relatively short time by a cessation of all threatening symptoms. Another point, in view of the idea that labor itself produces kidney lesions, is that in all cases except I. the symptoms began to appear before labor set in and continued for a variable length of time after labor was ended. In Cases II. and V. labor could have had no possible influence in the production of nephritis, as there was no labor, the woman being delivered by *accouchement forcé*. Case IV. was different from the others in that albumin persisted for months after the delivery. This inclines one to the belief that there was here some permanent lesion and that pregnancy had nothing to do with it. Did the pregnancy, or did it not, cause the kidney troubles? In favor of it speak the occurrence of albuminuria and nephritis during the pregnancy; the prevalent belief among obstetricians that a causal relation exists between the two, and the disappearance of all symptoms in the great majority of cases after the labor had been completed. Against it are the facts that in the great majority of cases (87.4 per cent.) there were absolutely no symptoms which pointed to a change in kidney function; that in the overwhelming majority of cases the albumin disappeared under medical treatment, although the pregnancy was not interfered with; that there was no return of symptoms in any case when once they had disappeared, and particularly in the one case in which even nephritis had shown itself; that in 2 cases, 1 of albuminuria and 1 of nephritis, the symptoms persisted, in 1 after treatment and in 1 after delivery, leaving in the latter case the strong inference that some other factor had been the cause of the nephritis.

Stewart explains the production of the kidney troubles as follows: He says that the conclusion is not far-fetched that in the cases of simple albuminuria the pressure of the enlarging uterus upon the intestines produced sluggishness in peristalsis and consequent constipation; this in turn caused retention of the products of composition, their subsequent absorption into the general system, and thus additional work was thrown upon the kidneys; the consequent effort upon the part of the kidneys to throw these products out of the system would in time produce hyperæmia of those organs, kidney fag, and, hence, albuminuria. Thus could we also account for the great immunity which exists among pregnant women among the 87.4 per cent. who never showed albuminuria at any time. The processes which result in albuminuria are probably identical with those which produce nephritis. The process means in its simpler stages, simple albuminuria, with restoration to the normal by simply unloading the intestines and the liver; in its severer forms, in those cases in which the intestines are neglected or the digestion is overtaxed, the albuminuria does not yield so readily and the condition is not readily relieved; in the still severer forms hyperæmia becomes more persistent, and then occur red blood corpuscles, leukocytes and casts, nephritis. The pregnant woman, judging from these facts, is no more liable to disease or disturbance of kidney function than the non-pregnant woman. The pregnant woman may have albuminuria or nephritis from causes which would be operative in the other case and which would have no reference to pregnancy. This theory makes the hepatotoxæmias and autotoxæmias secondary factors and removes them from the category cf primary or essential causes. A pregnant woman is constantly trying to poison herself, but, as this occurs in every other individual whose intestines do not perform their functions, pregnancy need not be invoked as the principal cause. In contrast with Stewart's observations the careful work of Little[1] is most interesting. He says that the majority of medical men look upon eclampsia as coincident with, if not consequent upon, renal disease, and consider the condition of the urine of the greatest importance in the diagnosis of impending eclampsia. The presence of albumin, however, must be considered of doubtful significance unless two important points are continually kept in mind: First, that the investigations of Ingerslev, Schroeder and Charpentier have conclusively proven that eclampsia may occur independently of the presence of albumin in the urine; and, second, that albuminuria is much more frequently present during pregnancy, labor, and the puerperium than is generally supposed; so that deductions made, as to the patient's condition, based on this abnormality alone, are difficult to make and questionable when made.

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[1] American Journal of Obstetrics, September, 1904.

With the object of ascertaining how frequently albumin is present, an analysis of the urinary records of 967 patients confined in the Johns Hopkins Hospital was made. These records were not uniform, in that each case was not invariably examined before, during, and after labor; so that the results under each of these headings must be considered separately. Voided specimens were examined once a week during pregnancy, usually on the tenth day of the puerperium; a specimen was also obtained by catheterization during or immediately following the third stage of labor. The results are as follows:

TABLE I.

	Pregnancy.			Labor.			Puerperium.		
	Total, 715	I-para, 418	— para, 297	Total, 560	I-para, 341	— para, 219	Total, 538	I-para, 302	— para, 236
Negative	49.2	46.9	52.5	37.0	33.7	42.4	43.0	40.0	46.6
Albumin, all cases . .	48.8	51.2	45.5	62.0	66.3	44.3	56.5	59.6	52.5
Casts and albumin . .	10.1	11.5	8.0	18.0	22.0	11.9	11.5	13.9	8.9
Casts, no albumin . .	1.9	2.0	2.0	0.5	......	1.4	0.5	0.4	0.9

The figures signify percentages except in the uppermost line.

These results differed so markedly from those of other observers that it was decided to make a further careful investigation of 100 consecutive cases, examining both voided urine and that obtained by catheterization, with a view of confirming our previous results or determining where they were in error. Voided specimens were examined weekly during pregnancy, and another specimen the fourteenth day of the puerperium by the registry clerk. Catheterized specimens were obtained once every two weeks during pregnancy, immediately after the third stage of labor and on the tenth day postpartum. The latter were personally examined. By examining both voided and catheterized specimens, it was possible to note whether catheterization had any influence upon the results obtained, as well as how closely the findings of two observers would correspond when working with specimens obtained at different times from the same patient. The presence of albumin was determined by boiling and the addition of a few drops of acetic acid. When in doubt, the nitric acid test was also used. Fehling's solution was used for the sugar tests. It was never found during pregnancy, but a few specimens obtained postpartum gave a typical reaction.

TABLE II.

	Pregnancy.						Labor.			Puerperium.					
	Catheterized.			Voided.			Catheterized.			Catheterized.			Voided.		
	Total.	I-para.	+ para.	Total.	I-para.	+ para.	Total.	I-para.	+ para.	Total.	I-para.	+ para.	Total.	I-para.	+ para.
Totals regularly examined	85	52	33	73	48	25	100	62	38	93	58	35	54	36	18
Negative	54	54	54.5	53.5	58	44	10	5	18	62	62	63	44	42	50
Albumin, all cases	46	46	45.5	46.5	42	56	89	95	79	31	33	28.5	56	58	50
Albumin and casts	14	7.8	24	4	...	12	41	45	34	8.6	8.4	9.0	6	6	6
Casts, no albumin	...	...	...	...	...	...	1	...	2.7	6.5	5	0.9	...	...	...

Comparison of results obtained from the examination of voided urine and that obtained by catheterization. The figures signify percentages save in the upper line.

From this table it will be seen that, considering the albuminuria of pregnancy, in comparison with the results in Table I., there is little material difference. Albumin was found in 48.8 per cent. and 46.5 per cent. of the voided specimens in the two series, respectively, and 46 per cent. with catheterized urine.

Another table of statistics is given showing the results obtained by other observers; these include Ingerslev, Flaischen, Lantos, Fischer, Pajikull, Trantenroth, and Zangmeister. Accurate results in these investigations are obtained by the frequent examination of a moderate number of cases, rather than by the study of a large number in which no regularity is observed. In the table referred to only the work of Lantos, Fischer, and Trantenroth fulfils this condition. Trantenroth found albuminuria during pregnancy in 46 per cent. of primiparæ and 45 per cent. of multiparæ, a result very similar to that of the writer. There is a wide variation in the results obtained by the above-mentioned observers which can readily be explained, since in most cases there was but one examination of the urine and the figures were in great part taken from hospital records, which were probably lacking in uniformity if not in accuracy. The results obtained by Trantenroth and Zangmeister as to the incidence of albumin in the urine immediately after labor are about similar to those arrived at by the writer. The marked increase in the number of casts found in the author's results are ascribed to the great care taken in searching for them. Pajikull found that their frequency varied directly with the speed of his centrifuge and the time of centrifugation. In regard to albuminuria during the puerperium, in both series the results—56 per cent. and 56.5 per cent.—obtained from voided specimens are higher than that given for the catheterized series—31 per cent. This is thought to be due to contamination of the voided specimens by the lochia and is fairly in accord with the records of Pajikull, who found 32 per cent. and 38 per cent. in his own and hospital cases, respectively. The following deductions are made from the foregoing tables:

1. Albumin is noted in the catheterized specimens of urine from about one-half of all the pregnant women, being equally frequent in primiparæ and multiparæ. On the other hand, albumin is found more frequently in voided specimens from multiparæ. This accords with the investigations of Zangmeister and Trantenroth.

2. Casts (Table II.) apparently occur with greater relative frequency in multiparæ, as noted by Zangmeister.

3. At the time of labor there is a marked increase in the incidence of albumin alone and of albumin associated with casts, the increase in each case being specially marked in primiparæ. This may be due to the muscular work and increase of blood pressure during labor.

4. It is not unusual during pregnancy, labor, and particularly the puerperium, to find casts present without the presence of albumin. While this is in accord with Fischer's observations, it must be borne in mind that the quantity of albumin may have been too small for easy recognition.

5. Albumin and casts are frequently found in the puerperium, but less often than in pregnancy. It is noteworthy that in no case was albumin present during pregnancy and absent at the time of labor, while there were only 3 cases showing casts in pregnancy and not at labor. Two-thirds of the cases showing casts at the time of labor presented albuminuria during pregnancy.

These general facts were noted when considering the series of cases represented in Table I.:

1. In 9 cases of threatened eclampsia and 25 others with definite eclampsia albumin was invariably present. In the latter group casts were present in 22 out of 23 cases examined.

2. A case of hyperemesis gravidarum showed much albumin and many casts. This with another unrecorded case bears out Lindemann's observations as to its toxæmic character.

3. The persistence of albumin and casts during the puerperium was most marked in those cases in which they were noted during pregnancy.

Thus, of 77 cases, 34 showed the condition only at labor; in 19 others not positive before labor it disappeared on the average in 3.5 after labor; while of the remaining 24 cases in which the condition had been noted during pregnancy, 33⅓ per cent. showed albumin as late as the tenth day.

4. Albuminuria was noted in 4 cases of abortion, 2 of which were due to syphilis and 1 each to typhoid fever and chronic nephritis. In no case was abortion associated with uncomplicated albuminuria.

5. Nausea and vomiting had been noted in 20 per cent. of the primiparæ and 33⅓ per cent. of the multiparæ, who later showed albuminuria, and œdema was present in one-third of the cases.

6. In 75 per cent. of the cases the first note of the condition was made within the last eight weeks of pregnancy, being most frequent two to four weeks before labor. This figure is possibly due to the fact that a large number of the cases enter the hospital at about this period of pregnancy.

While in an even number of cases it is shown that the percentage of blacks who show casts ten days after labor is greater than the whites, a greater number of the white multiparæ show casts during later pregnancies.

Puerperal infection, or intercurrent disease in the puerperium, appears to influence the duration of the albuminuria. In multiparæ where there was no definite rise of temperature during the puerperium, the duration of the albuminuria postpartum seemed to vary with the time of onset during pregnancy, early incidence being for the most part associated with long duration. In only one case was albumin noted late in the puerperium where not of long duration in pregnancy, and this was after curettage for subinvolution. The time of appearance of albumin during pregnancy varied with the voided and catheterized urine. In the voided specimens in most instances it appeared between the thirty-fifth and fortieth week. In the catheterized specimens it was not noted until about the thirty-eighth week. It was assumed that the regular mode of living, easily digested food, daily movement of the bowels, and more particularly a daily warm bath, had much to do with diverting a large portion of the toxic substances from the kidneys.

The writer was unable to confirm Zangmeister's statements concerning the effect of the duration of labor, either upon the frequency of albumin or its amount when present. It was found that the character of the pelvis had no appreciable effect on the incidence of albuminuria.

The average weight of the children was 3255 gm. (6.5 lbs.), and the whites were invariably heavier than the blacks. The children of white multiparæ are heavier on the average than those of primiparæ, while the reverse is true of the blacks. There was no definite relation between the weight of the children and the renal condition, though other observers have thought that the dystocia resulting from excessive weight of the children predisposed to albuminuria. The average weight of the placenta varied between 16.5 and 17 per cent. of the weight of the corresponding child. The writer was unable to note any definite relation between the grade of albuminuria and the extent of infarction in the placenta, which is not in accord with the well-known association of extensive infarct formation with albuminuria. The relative average age of the patients bore no relationship to the renal condition. These cases have been divided by von Leyden into two groups—(*a*) true nephritis; (*b*) the kidney of pregnancy—the former showing a typical acute parenchymatous change with exudate; the latter a large, pale kidney, apparently the result of a degenerative process which, in some cases, was so pronounced as to suggest the action of a corrosive irritant. Clinically, the two conditions were only to be distinguished by the severity of the symptoms. These cases belong entirely to the latter class. A true nephritis characterized by general symptoms and the presence of blood in the urine is a rare condition, having occurred but once in 1500 cases in the Johns Hopkins Hospital wards. Theories as to the cause of albuminuria in pregnancy may be divided into two classes: theories of mechanical pressure and those based on quantitative or qualitative alteration of the blood. Later observers have for the most part abandoned the pressure theories and sought to explain the condition by changes in the circulating blood, but the question is, as yet, by no means settled. Whether the blood serum of a pregnant woman is more toxic than usual or not, there can be little doubt that the presence of a living fetus is accountable for the presence in the circulation of certain products, causing headache, nausea and vomiting, and even hyperemesis gravidarum, with accompanying changes in many of the abdominal organs.

Eclamptic attacks usually cease with the death of the fetus, and the disappearance of the albuminuria under the same circumstances has been demonstrated.

The fact that the condition of the patient has almost invariably been benefited by stimulation of the excretory organs, other than the kidney, would appear to be the strongest argument in favor of an intoxication; while the whole train of symptoms bears a striking analogy to those induced by other toxins, notably as in scarlet fever. There is no definite proof that the condition of toxæmia is secondary to the kidney condition, and the fact that in some toxæmias other organs than the kidney may show the most marked changes is a definite argument against this contention.

Eclampsia. "SPECIFIC" IRRITABILITY OF THE GENERAL NERVOUS SYSTEM IN PREGNANCY. It seems very probable that the nervous system shares in the many changes which take place in the maternal organism during pregnancy. Blumreich speaks of a nervous excitability of a special or "specific" type in the brain of a pregnant as compared with that of a non-pregnant woman. This B. Wolff[1] believes to be of especial significance in the study of eclampsia. He experimented upon pregnant and non-pregnant bitches, and observed the time which elapsed before the onset of convulsions after the removal of both kidneys in each group. His conclusion was that the uræmic poison acted with the same degree of intensity in both groups. After employing injections of kreatin Blumreich and Zuntz found the cerebral tissues of pregnant bitches more easily excited than those of bitches which were not pregnant. Blumreich then concluded that the irritability of the brain in pregnancy is "specific" in that it is not excited by all irritants, but only by some. B. Wolff found in his experiments (1) that in those instances in which he removed both kidneys of pregnant bitches the fetus frequently died *in utero* before the onset of uræmic symptoms; (2) that uræmic convulsions after double nephrectomy were quite the exception and not, as Blumreich stated, the rule.

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[1] Zentralb. f. Gynäk., 1904, No. 26; Journal of Obstetrics and Gynecology of the British Empire, August, 1904.

In these experiments the gestation products were found to be macerated at the time of the mother's death; hence the question as to the kind of excitability the mother's nervous system underwent during pregnancy could not be ascertained in this way, since after intrauterine fetal death the animal experimented upon could no longer be considered pregnant in the fullest physiological sense of the term. With regard to the onset of uræmic convulsions after double nephrectomy, Blumreich had experimented upon 28 animals in all, some pregnant, some not; without exception typical, violent, general convulsions occurred in every case. Wolff's results were in complete antagonism to these. In 79 total nephrectomies performed on bitches by him, 41 animals died on the second day and 4 on the third day after operation. In 29 cases sudden death from uræmia occurred, and in only 2 cases were general convulsions noted. Wolff's conclusions were (1) that experiments upon animals seem to make it probable that the central nervous system of women is more easily excited in the gravid than in the non-gravid state; (2) we have not sufficient knowledge to express an opinion of the nature of this irritability, and it is premature to speak of a "specific" cerebral excitability.

THE PATHOLOGICAL ANATOMY AND THE PATHOGENESIS OF THE TOXÆMIA OF PREGNANCY. Ewing[1] has for a number of years past pursued continuously the study of the pathology of the *hepatic toxæmia of pregnancy*, and, while it is not complete, the material points to some definite conclusions which it seems desirable to present. He has demonstrated the hepatic lesions of three clinical manifestations of the toxæmia of pregnancy.

Eclampsia. Hemorrhagic hepatitis occurs in practically all typical cases of acute fatal eclampsia at term and in at least 95 per cent. of all cases of any variety of eclampsia, and is pathognomonic of this type of the disease. The liver is usually of normal size, reduced in consistence, while the surface and section present many minute hemorrhagic foci. Microscopically, there is a uniform and intense granular, hydropic, and fatty degeneration of the liver cells, which results in the abolition of their function. Focal necroses and minute hemorrhages are numerous.

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[1] The American Journal of Obstetrics, February, 1905.

Acute Yellow Atrophy. Illustrated by a patient aged twenty-one years, pregnant four and a half months. She suffered for two weeks with severe headache, epigastric pain, and vomiting. The vomiting gradually ceased, but the headaches continued and the patient became hysterical. Slight fever, epistaxis, jaundice, and muscular twitchings, with one general convulsion, occurred two hours before death. The urine was free from albumin and casts, but contained leucin and tyrosin. This case falls between eclampsia and acute yellow atrophy; it completely fits neither type of disease, but serves the purpose of illustrating the connection of acute yellow atrophy and eclampsia. The liver was slightly reduced in size and consistence; its section mottled red and yellow. There were complete hydropic and fatty degeneration of the inner two-thirds of the lobules, an intermediate zone of necrotic and disintegrated cells, and a narrow peripheral zone of cells showing slight granular and fatty degeneration.

In the third case the patient had eclampsia with minimal hepatic lesions. Macroscopically the liver was but slightly altered; microscopically it revealed moderate diffuse granular and fatty degeneration, foci of intense degeneration with disorganization of the liver cells, foci of partial necrosis in which the cells show watery contents and pyknotic nuclei, and areas where the cells are distended with bile pigment. These lesions belong to the process of autolysis of the liver cells, which is attended with profound alterations of the function of the organ.

These three cases show that eclampsia may exhibit the hepatic lesions of (1) hemorrhagic hepatitis, or (2) acute yellow atrophy, or (3) no striking gross changes, but only microscopic lesions of the process of autolysis of the liver cells.

Three cases of *pernicious vomiting* are also recorded. The first was a well-nourished patient, aged twenty-six years, who had vomiting in the first three months, which subsided and returned in the eighth month. The vomiting increased in severity for two weeks, accompanied by abdominal pains and mental dulness. There was no jaundice nor convulsions. Coma appeared two days before death. The liver was anæmic in appearance, and typically "nutmeg." Microscopically there were complete necrosis of the inner two-thirds of the lobules, extreme hydropic degeneration of the outer third, with a peripheral zone showing moderate fatty degeneration. The second patient, well nourished, aged thirty-two years, had severe vomiting in previous pregnancies. The third pregnancy began with severe vomiting, which subsided in the second month, but again became acute in the eighth month. She was treated as hysterical and the vomiting was controlled two days by moral suasion. She died on the eighth day of the attack, without convulsions or jaundice and after vomiting had nearly ceased.

The liver was very soft, mottled red and yellow. There was intense granular hydropic and fatty degeneration of cells. The cells in the inner half of the lobules were necrotic and nearly disintegrated.

Case III. was that of a woman who had been acting strangely and vomiting repeatedly for a week before being brought to the hospital. Her symptoms were attributed to alcoholism. She was transferred with a diagnosis of hysteria and fibroids, but was found to be pregnant and suffering from toxæmia. The urine contained a faint trace of albumin, leucin, and some casts. There were no fever, jaundice, or convulsions, but death occurred in twenty-four hours. The liver was very soft, congested, and fatty, and the blood remarkably thick and cohesive. There was intense degeneration, granular and hydropic, of the liver cells. The hepatic lesions of these three cases of pernicious vomiting are identical with those just demonstrated in the last two cases of eclampsia. As one of these cases of pernicious vomiting gave a distinctly atrophic liver, the general conclusion must be drawn that the morbid process in eclampsia, acute yellow atrophy, and pernicious vomiting of pregnancy is one and the same. Similar lesions were observed in pregnant animals.

10 c.c. of blood from pernicious vomiting in Case III. was injected into the peritoneal cavity of a rabbit. The animal had muscular spasms after twenty minutes, seemed moribund, but recovered. Five days later it died, the liver being in a state of extreme degeneration, granular, hydropic, and fatty. 10 c.c. of normal human blood injected into the peritoneal cavity of a rabbit rendered the animal restless for about thirty minutes, with no further symptoms.

A case of *acute yellow atrophy* occurring after abortion at two months is also reported. The patient was a poorly nourished woman aged about forty years. She never recovered from the abortion, but suffered from indigestion, vomiting, and abdominal pain. Death occurred on the fourteenth day. The liver was very soft, uniformly deep red, with the lobules obliterated. Microscopically, it showed the late stage of acute yellow atrophy. Two cases of *acute leukæmia* following pregnancy are also reported, both terminating fatally. The lesions in the liver were those of acute yellow atrophy, with extensive necrosis. Two facts seem to connect acute leukæmia and the toxæmia of pregnancy. First, the occurrence of leukæmia shortly after pregnancy, which seems to be too frequent to be explained as a mere coincidence; and, second, the presence of leucin and tyrosin in the urine, both of leukæmia and of the toxæmia of pregnancy. Other cases suggest that the toxæmia of pregnancy may have an important relation to the severe anæmia which follows parturition, and to bear a fundamental relation to puerperal sepsis.

Ewing believes that the disturbance of nitrogenous metabolism which is responsible for the clinical manifestations of the toxæmia of pregnancy is a failure of oxidizing capacity on the part of the liver. The proteid derivatives, which are normally combined by the liver into urea, are no longer combined, but circulate free in the blood in poisonous form, and are to some extent excreted by the kidneys. Other proteid derivatives, as those containing sulphur, also fail to be oxidized and contribute to the toxæmia.

Large quantities of leucin, tyrosin, and lysin have been found in the blood of acute yellow atrophy. The complex nature of the source of these poisons renders less obscure the fact that the clinical manifestations of the toxæmia of pregnancy vary from mild vomiting to acute yellow atrophy.

Recent study of the toxæmia of pregnancy and of many other clinical conditions furnishes abundant evidence that the morbid process in acute yellow atrophy is of very frequent occurrence and is often followed by recovery. On both clinical and pathological grounds there is just as little reason for separating the mild and fatal cases of vomiting of pregnancy as for denying the identity of mild and severe cases of diabetes.

The urinary changes indicate chiefly deficient oxidation of proteid derivatives. Instead of urea, uric acid, ammonia, leucin, and tyrosin and other unoxidized proteid radicles appear in the urine, and instead of sulphates there are unoxidized sulphur compounds. As leucin, tyrosin, and ammonia are estimated with urea by the hypobromite method, this test is unreliable in following the urinary changes in pregnancy. He believes that the examination for various unoxidized proteid derivatives will prove a fairly reliable indication of the seriousness of the case. It is not sufficient to examine the urinary sediment for leucin and tyrosin, but the urine freed from albumin must be precipitated by basic lead acetate, filtered, the lead removed by a current of hydrogen sulphide, and the filtrate evaporated to a syrup in which characteristic crystals of leucin are identified by the microscope. Albumin and casts are sometimes present, but may be absent in dangerous stages of the disease and even in fatal cases.

The absence of jaundice is characteristic of fatal cases of vomiting of pregnancy which show the hepatic lesions of acute yellow atrophy. In these cases the bile-producing function of the liver is inhibited.

The present view of the toxæmia of pregnancy classes the disease as a functional disturbance of the liver, usually attended by severe anatomical lesions of this organ and secondarily by functional and anatomical disturbance in the kidneys and other organs. The production of urea is exclusively a function of the liver. While disturbance of the kidneys exists from the first, it only becomes pronounced when poisons resulting from failure of oxidation cause degeneration, congestion, and exudative inflammation in these organs. Hence the disease may be far advanced before albuminuria appears. As the disease is originally a functional disturbance of the liver, we find some cases with minimal lesions of the liver. Of recent theories the part which the thyroid gland plays in connection with the morbid process is worthy of consideration. Two conditions found at the autopsy table were of striking interest. One was the distention of the intestinal tract with saline solution in a subject which had failed to absorb any of the fluid, and the other was the remarkable concentration of the blood in some cases. In two cases the blood was found remarkably thick, viscous, and cohesive to an extent which must have been of itself dangerous to life. While saline solution is indicated, it cannot be relied upon in a patient who is incapable of absorbing fluids. The absence of any necessarily fatal character in the disease is recognized in the pathological study. If the poison can be eliminated or its further production prevented there is nothing in the majority of the lesions which is incompatible with life, and there is demonstrable proof that extensive lesions of the liver of the present type are sometimes followed by spontaneous recovery. Saline irrigation and infusion are apparently most effective in serious stages. *Ringer's fluid* is recommended also. It has proven much more effective than the simple saline solution in many conditions, and there are special indications for its use in the toxæmia of pregnancy which has the features of an acid intoxication. Its composition is as follows: Sodium chloride, 7 grams (15 grs.); calcium chloride, 2 grams (30 grs.); potassium chloride, 1 gram (15 grs.); sodium bicarbonate, 1 gram (15 grs.); aqua dest., 1000 c.c. (2 pints). This solution is best prepared with distilled water recently boiled, and the salts must not be heated enough to decompose the sodium bicarbonate.

ETIOLOGY AND TREATMENT OF ECLAMPSIA. A thorough study of eclampsia with regard to the etiology and treatment was made by Zweifel[1] in the laboratories and wards of the Leipzig Clinic. He reviews the literature of the subject and discusses the theories of Monk, Bidder, Traube-Rosenstein, Bouchard, Speigelberg, Schümacher, Schmorl, and others. From his and other investigations it seems proven that the cause of eclampsia is a poison which is formed within the patient's body and circulates in her blood. The poison attacks the epithelia of the parenchymatous organs, damages the heart muscle, and seriously disorganizes the blood. To ascertain the identity and nature of this poison was the object of Zweifel's experiments.

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[1] Archiv f. Gynäk., Bd. lxxii., 1904.; American Journal of the Medical Sciences, August, 1904.

He first examined the urine of the patients with respect to the percentage of urea excreted, taking as a basis of comparison the normal amount of urea excreted by man, which represents 83 per cent. of the nitrogenous matter excreted. The amounts of ammonia, uric acid, and albumin were also noted. He studied the amount of nitrogen in the purin bases and compared the amount secreted by healthy patients with that secreted by those suffering from eclampsia. It was found that in eclampsia the amount of urea excreted in proportion to the whole nitrogenous waste was much lessened and that the more albumin there was the smaller the quantity of urea. During the course of a case of eclampsia as the excretion of urea increased the amount of albumin decreased. Therefore, he believes that if a careful record of the quantity of albumin be kept during the progress of a case, it would indicate the increase or decrease in the excretion of urea and thus the condition of the patient could be shown. The condition of the urine in eclampsia is most rationally explained as due to an inefficient oxidation of albuminoid materials. He found that it was impossible, after estimating the quantity of urea in the blood, to use the result as a means for prognosis.

In investigating the salts of ammonium he reviews the results of Zangmeister's experiments. These results showed an increased amount of ammonium compounds excreted in eclampsia. Zweifel's conclusion is that the poison of eclampsia is an organic acid capable of oxygenation and readily changeable into various compounds. He draws attention to leucomains and ptomains, and also to the sulphates in the urine of eclamptic patients as indicating the degree in which the unknown acid remains free or undergoes combination. In his investigations he found that the more severe the attack of eclampsia the smaller the quantity of sulphates in the urine, and so the greater the quantity of neutral sulphur. This result points to a lack of oxidation of the albuminoid materials as the primary cause of eclampsia.

In trying to determine the nature of this acid, Zweifel finds that lactic acid is the only one demonstrated by his investigations which is poisonous and which is not formed in the metabolism of healthy human beings. It is also significant that cases of nephritis without eclampsia do not give the same results when metabolism is studied.

Clinically, he calls attention to the cases of epilepsy in which convulsions occur and are sometimes mistaken for eclampsia. Cases of poisoning are cited in which patients die in convulsions which are not the usual form of eclampsia. The tendency to eclampsia seen in multiple pregnancy is also remarked, and also the failure of the theory of dilatation of the ureters to account for eclampsia. It is an interesting fact to observe that eclampsia differs in frequency and mortality in different parts of the world. In Würtemberg and Vienna eclampsia is much less frequent than in other parts of the continent of Europe. This is explained by the use of light wines and beverages containing tartrates of sodium and potassium, which combine with bases in the food preventing the formation of lactic acid.

In the prophylactic treatment Zweifel would limit strictly the amount of meat and eggs eaten and encourage the use of fruits and vegetables. Sugar and starch do these patients no harm and may be permitted. He would also give freely effervescing beverages containing the tartrates and carbonates of sodium and potassium. In the actual treatment of the convulsions he calls attention to the danger of using narcotics and especially chloroform for an indefinite period, as fatty degeneration of the heart muscle and epithelia of secreting organs has been observed in these cases. He is not in favor of profuse sweating, as he tried it faithfully and with no benefit. Pilocarpine, he says, should never be employed.

Zweifel was formerly in favor of waiting for spontaneous dilatation of the uterus before delivering the child. His mortality in his treatment by that method was 32.6 per cent. He practised immediate delivery by Dührssen's method of incision for three years, when the mortality sank to 15 per cent. and in some cases as low as 11.25 per cent. Glockner's experience was similar. Bumm divides his treatment of eclampsia into three periods: one in which narcotics were freely used with 30 per cent. mortality; a second period, when in addition to narcotics baths and packs were used, with a 30 per cent. mortality, and a third period when delivery as soon as possible after the first convulsion was practised, with a mortality of 12 per cent. Olshausen had a mortality of 16.9 per cent. It was noted that convulsions ceased in 81 per cent. of his cases after delivery. Zweifel believes that the general practitioner, when confronted with a case of eclampsia with convulsions, should immediately rupture the membranes, and that this will have a good influence in lessening the convulsions. If the cervix be partly dilated the dilatation may be completed by the hand or elastic bags and delivery accomplished by forceps or version. If the vaginal portion of the cervix has not been obliterated he believes that Dührssen's incisions or vaginal hysterectomy or Cæsarean section by the abdominal route should be performed. He does not favor the use of Bossi's dilator.

Considering the want of unanimity upon the subject of the treatment of puerperal eclampsia, Berkeley[1] was led to obtain the opinions of the leading teachers and practitioners of obstetrics in the United Kingdom, with the object of formulating, if possible, some generally acceptable outline of treatment. With this object in view one hundred and ten circulars were sent out containing various questions. Fifty-six replies were obtained, including the chief authorities upon the subject. The different ways of treating eclampsia are as follows: 1. By the administration of drugs. 2. By venesection. 3. By saline injections. 4. By baths and packs. 5. By abdominal Cæsarean section. 6. By vaginal Cæsarean section. 7. By *accouchement forcé*. 8. By delivery with forceps or version after full dilatation of the cervix.

1. *By the Administration of Drugs. Chloral* is given alone or in combination with potassium bromide. The majority of those replying do not use it; nine favored its use, while seven used it under certain conditions. *Chloroform* is used by all for operative measures, and also by the majority at times in combination with other treatment, either during the fits or when other means of controlling them have failed. Various opinions were expressed as to its usefulness in warding off the fits. Two consider it very useful and think it the principal drug, while others consider it dangerous and do not advise it. *Morphine* is used to inhibit metabolism and so stop the formation of poisons. Large doses remove the state of spasm in the renal arteries and so favor urinary secretion. It was found that a majority of those written to used it as a routine measure. Jardine has entirely given up its use, but Croft favors it if there is no marked renal embarrassment. *Pilocarpine* is liable to cause œdema of the lungs and excessive secretion, so that the patient may be practically drowned. The majority of replies did not favor its use. Pearson has seen great benefit from its use, and Bonney always gives it and has never seen any bad effects. *Purgatives* lower the arterial tension, remove any matter in the intestines that may be the source of reflex action, and expel some of the poison. The majority give some kind of a purgative as a routine treatment, but give no particular reason for so doing. Herman thinks purgatives more likely to do harm and advises against them. Kinkhead, Gibson, and Wilson prescribe enemata; Fothergill and Kynoch favor rectal lavage, especially if the patient is comatose.

Thyroid extract aids the metabolism of nitrogenous substances, the formation of urea, which is a powerful diuretic, and is a powerful vasodilator, and therefore favors renal activity. A very large majority of those answering had had no experience with it. Nicholson, who has used it widely and recommends it highly, gives 40 grains of the extract, follows it up soon after with a similar dose, and continues until symptoms of "thyroidism" appear. Maclean and Ballantyne have used it and think well of it.

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[1] Journal of Obstetrics and Gynecology of the British Empire, March, 1904.

Veratrum viride lowers the blood pressure by dilating the arteries and depressing the heart. It is also said to promote the activity of the skin, to lower the temperature, to relax the cervix, and promote diuresis. It is not very widely used in the United Kingdom, and the opinion seems to prevail that it is not of much value.

2. *By Venesection.* In most cases the value of this treatment seems to be doubtful, although under certain circumstances of overdilated right heart and engorgement of the lungs it is of undoubted value. The great majority of those replying thought that bleeding should only be employed when great cyanosis is present, and should then be followed by a saline injection.

3. *By Saline Injections.* This acts by relaxing the arterioles and lowering the blood pressure, with a consequent greater supply of blood to the glomeruli of the kidney and renewal or increase of the urinary secretion; it also causes diaphoresis and dilutes the poison. Jardine has succeeded in lowering the mortality of eclampsia in the Glasgow Maternity Hospital from 47 per cent. to 17 per cent., the patients in both cases belonging to the same class. Berkeley divides the answers to his circular into four classes: 1. Saline is injected to take the place of the blood abstracted by venesection, which is employed for plethora only. 2. Bleeding is advocated as a routine measure with the intravenous injection to follow. 3. Saline infusion is thought to be contraindicated; Kinkhead, McCall, and Newnham do not use it, and Spencer is not satisfied that it does any good. 4. The treatment is used as a routine measure and is thought highly of by twenty-five of those who replied.

4. *By Baths and Packs.* The hot-water bath cannot be used if delivery is near, and it is difficult to use if the patient is restless. The patient is wrapped in a sheet and put into the bath, the water being kept at 102° or a little higher for half an hour, then taken out and wrapped in a blanket, then more blankets wrapped around her and she is allowed to sweat for two hours. Herman thinks it is especially called for when a patient is dying from coma, the fits have ceased, the pulse is beginning to fail, and the temperature is normal or subnormal.

Hot-air Bath. This acts in a similar way to the hot-water bath and is easier to manage.

Hot Pack. Eight of those replying use the hot pack as a routine treatment, fifteen use it for various symptoms, and Targett, Newnham, Wallace, Wright, Kinkhead, and Williamson never employ any of these methods.

Cold Bath. This treatment is strongly advocated by Herman in those hopeless cases where, with a very rapid pulse, the temperature steadily rises to the neighborhood of 108°. The temperature of the bath should be between 70° and 80°, and the patient should be kept in it from a quarter to half an hour till the temperature has fallen to 102° F., then be wrapped in blankets and allowed to sweat. Andrews and Routh would also use them under these conditions.

5. *Abdominal Cæsarean Section.* Its indication is said to be in those exceptional cases when the cervix is so very rigid that it cannot be dilated sufficiently to get a bag in, but there seems not to be the slightest indication for its performance as a routine measure. It is a right and proper procedure when, the patient having died during the attack, a living fetus can be detected *in utero.* The majority of answers agreed that this operation is absolutely unjustified for eclampsia. Published statistics show a death rate of 47.7 per cent.

6. *Vaginal Cæsarean Section.* This operation, known as Dührssen's, the majority of those replying considered quite unjustifiable. Munro Kerr performed it in a case of rigid cervix and found it very easy.

7. *Accouchement Forcé* may be accomplished by De Ribe's bag, preceded by Hegar's dilator or tents if the cervix is not large enough to admit it. Twenty-two of those replying use it on certain occasions.

Manual Dilatation (Harris' method). If the cervix is rigid great force will be required, and there is danger of lacerating the cervix and a resulting death from sepsis or bleeding. Twenty-eight of those replying use this method on occasion.

Bossi's Dilator. Blacker, Spencer, Martin, Ballantyne, Haig Ferguson, Haultain, Kynoch, Munro Kerr, Russell, Jardine, and Byers have all used this instrument and speak well of it. Croft, after having tried it, prefers his fingers.

Cervical Incisions. For rapid delivery Dührssen has lately advocated deep multiple cervical incisions. Other authorities advise against the operation, since much surgical skill is required and the extraction of the child often seriously increases the incisions, thereby endangering the opening of the parametrium and laceration of the uterine artery. Haultain advises free incisions if labor has not commenced and Bossi's dilator shows any signs of causing tearing. Jardine advises incision of the cervix if it is rigid, and if there is any difficulty in dilating with Bossi's dilator.

8. *Delivery with Forceps or Version* as soon as possible. Herman alone contends that the only safe and proper treatment is to do absolutely nothing unless some complication other than eclampsia calls for further treatment.

Cases of eclampsia before or at term can be divided into two classes: 1. Where labor has not yet come on. 2. Where labor has come on. Berkeley, following these two divisions, then attempts to analyze the answers to plainly indicate what line of treatment each authority recommends.

Where Labor Has Not Yet Come On. Those who recommend *induction of labor* are Sir John Williams, Eden, Fairbairn, Williamson, Croft, Newnham, Haultain (if before six weeks from term), Stephenson, Byers, Gibson, Kinkhead, Campbell, Jardine, and Ballantyne, the last three if fits are severe.

The following do not induce labor: Andrews, Lockyer, Herman, Stevens, Fothergill, Rankin Lyle, Maclean, Purslow, Ballantyne, Haultain (if within six weeks of term), Munro Kerr, Nicholson, Jardine, Pearson.

Those who hasten labor are Blacker, Bonney, Dakin, Horrocks, McCall, Routh, Champneys, Tait, Hellier, Rayner, Wallace, Wilson, Wright, Haig, Ferguson, Russell. Spencer is not satisfied that this is good treatment unless the os is dilated.

The following leave the case to nature unless it is indicated that more urgent treatment is indicated: Boxall, Duncan, Targett, Donald, Edgar, Martin, Kynoch, and Brice Smyth.

Where Labor Has Come On. Wait till the cervix is naturally dilated and then deliver with forceps or version. Sir John Williams, Boxall, Horrocks, Targett, Croft, Donald, Fothergill, Rankin Lyle, Campbell, Gibson, and Brice Smyth.

Manual Dilatation with Forceps or Version. Lockyer, McCall, Croft (if cervix does not dilate properly), Newnham (twenty-two cases without a death), Wilson, Stephenson, Pearson, and Nicholson.

Bossi's Dilator with Forceps or Version. Blacker, Martin, Haultain, Munro Kerr, Russell, and Byers.

Manual Dilatation or De Ribe's Bag with Forceps or Version. Boxall, Williamson, Herman, Hellier, Maclean, and Wallace.

Manual Dilatation or Bossi's Dilator with Forceps or Version. Bonney, Ballantyne, Kynoch, Jardine, and Kinkhead.

Herman allows no interference of any description, and in the case of the child being dead would certainly let the woman die also without delivering her, as he holds that the woman has more chance if she is left alone than if she is delivered. At the International Congress in Geneva in 1896 the weight of opinion was in favor of emptying the uterus as soon as possible. The great reason for emptying the uterus is to stop the fits; whether it does so in the majority of cases is a matter of doubt. By a careful examination of the original papers of over 1500 cases Herman proves conclusively that fits continue *after* delivery in 52.5 per cent. of the cases. The fits stop *on* delivery in 47.5 per cent.

of the cases. It may be claimed that the *danger* is lessened by emptying the uterus, although the fits do not stop, since the mortality of those treated actively is less than that of those treated expectantly, and that with active treatment the case becomes one of postpartum eclampsia, which is the least dangerous of any variety. Taking the results of over 1600 cases to test this, Herman found that the mortality with active treatment is a little less than that of those treated expectantly, and if recent cases only are taken, where the increased antiseptic precautions are naturally in favor of lowering the mortality of active treatment, the difference of 2 or 3 per cent. is so small that if hurried delivery were indiscriminately practised by all who attend labor in all cases the mortality arising from operative delivery would soon overbalance the trifling and doubtful benefit of emptying the uterus. Porak gave the mortality for *accouchement forcé* as 6.3 per cent. and Bumm states that the mortality from forcible delivery is less than by any other method of treatment. How, the writer asks, is one to reconcile all these different statements and results? Is it possible that eclampsia is in reality, like puerperal fever, a symptom of a number of distinct and separate diseases, and that therefore the results of treatment may differ according to which variety one was treating?

Personally, I believe there is much truth in that query and that eclampsia is not so much a symptom of a number of distinct and separate diseases as a disease with a number of distinct and separate symptoms!

Treatment by Spinal Subarachnoid Puncture. A procedure lately advanced for the treatment of puerperal eclampsia is that of spinal subarachnoid puncture. It is suggested by T. Arthur Helme.[1] Our knowledge of the etiology and pathology of this disease is so unsatisfactory that we have been unable to outline any satisfactory basis for treatment. The suggestion offered here is a result of clinical study in two cases which were apparently of the same type of the disease. In the first case the puncture was not resorted to on account of the experimental character of the procedure and other unfavorable surrounding conditions; in spite of the treatment given, the patient died twelve hours after her first violent attack.

The second patient was aged twenty-nine years; she had had morning sickness all through her pregnancy. From the sixth month onward she had suffered from headaches and swelling of the ankles. The urine was scanty. The labor was normal, and when the child was born the mother was quite comfortable. Two hours later she complained of headache, vomited, and had a convulsion; her sight suddenly completely disappeared at the same time. During the day the convulsions occurred with increasing frequency and severity. At the beginning of the convulsions the patient was irritable between attacks, but later this condition gave way to stupor. The stupor increased to coma and her condition became progressively worse, she having had fifteen convulsions in ten hours. The patient was chloroformed, a pint of normal saline solution was given under each breast and by the bowel, and a spinal subarachnoid puncture was made in the lumbar region from which a drachm and a half of cerebrospinal fluid was withdrawn. The fluid escaped rapidly as though under pressure, and not drop by drop as occurs, for example, in health when the needle is inserted for cocaine anæsthesia. She was seen five hours later and the nurse reported that in the mean time she had had two very light convulsions. Her condition then was very much improved. She was able to talk and recognized those about her, sat up in bed to take her medicine, but was still totally blind. She improved steadily from this time and completely recovered her sight. The albumin disappeared from her urine six weeks after labor. The puncture was made as follows: The patient was placed upon her left side, the trunk flexed as far as possible, and the skin of the lumbar spinal region rendered aseptic. The highest points of the iliac crests were then determined and an imaginary transverse line drawn between these points; the left index finger was placed upon the point where this imaginary line crossed the spine, this point coinciding with the tip of the spinous process of one of the lumbar vertebræ. A hollow needle three and one-half inches long was then thrust into the skin half an inch to the right of the point held by the operator's left index finger; it was directed slightly upward and toward the middle line and pushed onward. By directing the needle in this manner one is able to pass beneath the lower edge of the lamina of the vertebra; otherwise much difficulty is often experienced in reaching the subarachnoid space.

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[1] British Gynecological Journal, May, 1904.

Krönig[1] published a report of three cases of puerperal eclampsia which he had treated by lumbar puncture, followed by a recovery in all cases. Krönig's belief is that as the blood pressure is raised in all cases of eclampsia, so at the same time will the pressure of the cerebrospinal fluid be raised. The first patient was a primipara who had had two convulsions before puncture of the subarachnoid space was made, and underwent another while the cerebrospinal fluid was being drawn off. Following the spinal puncture vaginal Cæsarean section was performed and the fits ceased.

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[1] Zentralb. f. Gynäkol., No. 39; Journal of Obstetrics and Gynecology of the British Empire, December, 1904.

The second patient had her first convulsion five hours after a spontaneous labor; the first was followed by five others in quick succession. The spinal puncture was then performed and another fit occurred during the procedure. Eleven more convulsions occurred in the following fifteen hours.

The third patient was a multipara who had previously had five normal labors. She had four convulsions when vaginal Cæsarean section was performed and the convulsions ceased. Fifteen hours later she became very drowsy and markedly cyanosed. Spinal puncture was then resorted to and with strikingly good results. Nothing much can be said as to the good effects of the treatment in such a small series of cases; no immediate result after the puncture was apparent.

Henkel also tried this treatment in 16 cases, and his final conclusion was that the drawing off of the spinal fluid had no influence over the course of the disease. He used injections of cocaine and scopolamine after the withdrawal of the cerebrospinal fluid, but he could not recommend this procedure as a sure means of preventing the eclamptic fits.

Four of the 16 women so treated died, a mortality of 20 per cent., which is the average and no improvement in that respect. While no death occurred from a puncture, it should always be regarded as a possibility. In 7 cases nothing could be drawn off; 1 of these cases died and at the autopsy no cerebrospinal fluid was found in the cord and but very little in the ventricles. In 5 cases only from 2 to 3 drachms of fluid could be drawn off. Of these, 2 women died. In 4 cases there was a great increase of the fluid, about 30 cm. being drawn off. Of these, 1 woman died. The spinal fluid was clear, sterile, and alkaline, and contained ¼ per cent. of albumin. Kamann[1] reports a case in which the autopsy also revealed an absence of cerebrospinal fluid. Thus it is seen that with marked anasarca there need be no œdema of the meninges leading to associated hydrops ventriculi, and, on the other hand, excess of spinal fluid is present when there is no œdema of the body. Henkel concludes that the quantity of the spinal fluid can have practically nothing to do with the production of convulsions in eclampsia, nor are the convulsions much influenced by the intraspinal injections of local anæsthetics.

Reports of additional cases treated by this means have appeared during the year, and while temporary relief from cerebral pressure can be credited to this treatment, there have been no cases that conclusively prove its permanent value. Indeed, even the hope of discovering an antitoxin for the treatment of this disease is limited by the conviction that prophylaxis alone is the hope of the eclamptic. Organs

[1] Münch. med. Wochenschr., 1902, p. 831.

destroyed by degenerative changes can never be restored, and the prospect of reducing the eclampsia mortality lies in the early detection of and correction of the factors underlying its causation. Statistical tables of the results of various plans of treatment that do not include critical study of the variety and severity of cases are really of small value. Hospital treatment alone shows better results than that of private practice, largely because better judgment is displayed in the selection of the treatment applicable to the varying conditions of this disease.

Icterus and Pregnancy. Two cases of icterus complicating pregnancy are reported by Bergesio.[1] The first case was that occurring in a primipara who was attacked at the end of her fifth month of pregnancy and died at the end of the ninth month in severe eclamptic convulsions. The second case was that of a woman who in two successive pregnancies developed intense icterus; in the first instance at the fourth month of pregnancy, and in the next at the fifth month. Premature labors occurred on both occasions. In this case the writer noted a diminution in the area of liver dulness, and found great functional derangement of the organ, as evidenced by the urine and feces. Valdagni points out two forms of icterus in pregnancy, the simple catarrhal form and the very grave form. Bergesio raises the question as to whether the latter form is not really an acute yellow atrophy of the liver so far as the alteration undergone by the organ is concerned. He considers that acute yellow atrophy and the grave icterus of pregnancy should be regarded as types of the same disease, the only difference being the cause of their production. From the extreme rarity of the severe form of icterus he maintains that it is unlikely that it is dependent exclusively upon pregnancy, and that the various toxins which produce such a grave condition of toxæmia are not the sole and special products of the pregnant state. The author is unable to explain the reproduction of icterus in successive pregnancies, and the reappearance of severe hepatic symptoms coincident with pregnancy in a woman who, when not in this condition, had perfect liver function.

The pernicious variety of icterus developing during pregnancy is now generally believed to be the result of a severe toxæmia. Whether the toxins are of syncytial or other origin and why in very rare cases the liver should undergo the changes characteristic of acute yellow atrophy are problems awaiting solution.

Pregnancy and Fibroid Tumors. It has been very interesting to observe the recent trend of thought of authors who have discussed the surgical relations of ovarian tumors and of uterine fibroids to pregnancy. The risks to a pregnant woman are unmistakably greater from the presence of an ovarian growth, not only during pregnancy, but at the time of labor and during the puerperium. Rapid growth, twisting of the pedicle, necrotic or inflammatory and septic changes so largely increase the risk of an ovarian growth that it has come to be a surgical maxim that an ovarian tumor complicating pregnancy should always, whenever discovered, be removed. The very opposite obtains with uterine fibroids complicating pregnancy. Studies of their life history under these circumstances have brought the conviction that in about 75 per cent. of cases the course of pregnancy, labor, and the puerperium is undisturbed. The maxim here is constant observation of the patient and her tumor, and interfere surgically only when plain indications are present.

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[1] Giornale di Ginec. e Pediat., 1904, No. 8.

Dakin[1] considers the subject of fibroids from the point of view of the effect of childbearing upon fibroid tumors of the uterus. It is important that the behavior of fibroids in this relation should be carefully studied so that the changes in their history, which may be expected to be produced by the presence of an ovum, may aid us in the prognosis and in deciding upon the best time of treatment. In general terms it may be said that the fibroid shares in the changes which affect the uterine muscle while this is developing in pregnancy and also while it is undergoing involution. The tumor often comes under other influences, commonly mechanical, which modify its usual simple course. Much depends upon the relation of the tumor to the uterine wall, whether it be submucous, subperitoneal, or interstitial. Its circulation may be interfered with by torsion of a pedicle, by pressure, or by the change brought about by the contraction of the bloodvessels of the uterus after labor. The writer considers the subject under the headings of Pregnancy, Labor, and the Puerperium.

During *pregnancy* it has been commonly observed that fibroids grow in practically all cases. The amount of the growth varies from the smallest perceptible amount to a size which makes the uterus pregnant at six months appear the size of a full-term pregnancy. Authorities do not agree whether the growth is most active in the earlier or later months. Could we assume with certainty that a fibroid would not grow after the fifth or sixth month, we could decide what procedure would be necessary in the case of a tumor which by the end of that month had reached a large size, but not a size sufficient to endanger either the woman's life or the termination of the pregnancy. In most cases the growth is a true hypertrophy; in others the increase in size is due to œdema. In the former cases most authorities agree that the hypertrophy of the myoma cells is more marked than that of the proper muscle cells. Doleris does not agree with this statement and says that the commonest form of enlargement is by increase in the connective tissue. Fibroids, whether submucous, subserous, or interstitial, frequently become œdematous during pregnancy. At times there may be spaces in the tissues filled with serum or in some cases with a brownish fluid containing red corpuscles and lymph cells. Doleris records having found extravasation of blood in the tumor and says that where this occurs there is a good deal of pain, especially if the collection go on to pus formation. Mere œdema, no matter how rapidly it develops, does not give rise to pain. The softening brought about by the œdema is a fortunate occurrence, for a tumor situated in the pelvic cavity is thus enabled to adapt itself during labor to what space there may be, and thus allow a living child to be born where it seemed impossible for the head to get past the obstruction. Necrosis rarely takes place during pregnancy. Peritoneal adhesions occur during pregnancy just as they may in the non-pregnant condition. In this case if strong adhesions are formed they may prevent the ascent of the uterus or if they occur in connection with a pelvic tumor may cause incarceration and abortion. The rupture of strong adhesions by the sudden righting of a tumor or by the artificial reposition of an incarcerated uterus may cause a dangerous intraperitoneal hemorrhage. In a large majority of instances in which there is a fibroid tumor of the uterus there will be a readjustment of the mass before the end of pregnancy, rendering the pelvic canal free for the passage of the fetus. This tendency should be remembered when the question of operating on a fibroid which seems likely to obstruct labor is being considered in the earlier months.

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[1] Journal of Obstetrics and Gynecology of the British Empire, August, 1904.

Fibroid tumors in the lower part of the uterus which fail to rise above the pelvic brim during pregnancy or early in labor are very likely, unless they are polypoid, to be injured to such a degree that degenerative and in some instances necrotic changes subsequently take place in them. Labor very seldom finds one of these tumors seriously in the way. Of 5500 patients delivered in the General Lying-in Hospital there was no instance of any obstruction to labor being caused by fibroids. Budin, in the Paris Maternité, and Porak and Macé, in the Charité, have recorded similar experiences. During labor it is common for fibroids to change their position. In most cases, though not so often as in pregnancy, a fibroid will rise above the brim of the pelvis in time to be out of the way of the advancing head; especially is this true of the subserous and interstitial varieties.

Except in those cases where the implantation of the tumor is so low down and generally posterior, and imprisoned by the presenting part of the child, the upper tractile force of the uterus, combined with the plasticity of the tumor itself, will gradually raise it above the brim of the pelvis out of danger. Intraperitoneal hemorrhage may take place if vascular adhesions of the uterus to surrounding parts are torn. The tumor may also be damaged during labor and afterward slough. A fibroid which has suppurated during pregnancy may rupture with fatal results during labor. Submucous fibroids, and occasionally the polypoid form in which the pedicle has allowed the polypus to come down to the vulva, have been expelled by the advancing head. As pregnancy rarely occurs in the presence of a submucous fibroid (and when it does abortion almost always takes place) it will be noted that the expulsion of a pediculated fibroid during labor is a very uncommon occurrence. Inversion of the uterus during or immediately after the third stage of labor, with spontaneous or artificial detachment, may also occur. Cervical fibroids, if small, have either sloughed or survived in an unaltered condition; the larger ones are squeezed out of their capsule, or when they are discovered to be in the way the capsule may be incised. If a fibroid tumor survives the course of labor without injury it usually undergoes involution along with the normal muscle fibres of the uterus. In some cases it reaches a size smaller than it was before the pregnancy. If this process be repeated on several occasions the tumor may become greatly reduced or, in a clinical sense, may entirely disappear. Regarding the mode of absorption, it seems probable that the myoma cells undergo the same process of involution as the normal muscle cells.

The opinion that it is caused by fatty degeneration is not supported by any weight of evidence. Hammarschlag believes that a myoma undergoes distinct changes in the lying-in period, which often lead to necrosis, and that these changes are brought about by the sudden cessation of the very free blood supply existing during pregnancy. They occur apart from injury or from any perimetritis over the tumor. Other writers, namely, Gusserow and Gebhard, do not concur in this explanation. Gusserow believes that such changes, with the fatty degeneration and pus formation, are due to traumatism in labor. He describes the usual change as consisting in the formation of a cavernous structure owing to shrinking of the muscle cells from the containing framework of connective tissue. These spaces are found to be filled with serum and the final stage is a kind of cirrhosis. Expulsion of the tumor during the puerperium is not uncommon; attention is usually called to them by hemorrhage. In a large proportion of such cases the tumor has been found gangrenous and caused the death of the patient by sepsis.

The writer concludes that in the coincidence of pregnancy with fibroid tumors of the uterus the tumor is not apt to suffer so often or so severely in labor as might be expected, and that a pregnancy complicated in this way will in almost all cases go to term, and that the tumor will survive the stress of labor and the starvation of the puerperium with impunity. There are bound to be cases, however, where labor is brought to a standstill by a deep-lying fibroid; if the tumor cannot be removed Cæsarean section is indicated.

The results of the studies in 23 cases of pregnancy complicated by fibroids are given by Winter.[1] He discusses the effect fibroids may have upon pregnancy, labor, and the puerperium, and the manner in which the fibroids may be affected by pregnancy.

Progress of the Pregnancy. Five cases progressed without any disturbance; 18 had pain of some kind, generally a sense of weight, bearing down, or actual acute pain. The pain was due to various causes, such as contractions of the uterus, circumscribed peritonitis, or secondary changes in the fibroid. Hemorrhage occurred five times, four times in cases of abortion, once in a submucous fibroid. One death occurred from pneumonia after an exploratory laparotomy and one from aneurysm. In 14 cases treated expectantly 9 ended naturally, 3 aborted, and in 2 labor came on prematurely. Labor occurred spontaneously in 9 cases, forceps was used once, and in 1 case a manual extraction of the placenta was necessary. The puerperium was afebrile in 9 cases; phlebitis and thrombosis of the saphenous vein occurred once, and 1 case died of sepsis. His conclusion is that when myomata are present there is generally some sort of a disturbance. It is, however, seldom serious and usually ceases spontaneously. Labor occurs normally if the fibroid be not so situated as to impose an insuperable obstacle to its progress; the third stage gives no trouble, as a rule, and the puerperium is aseptic so long as the usual antiseptic precautions are observed.

With regard to the influence of the pregnancy upon the fibroid, only the cases operated upon were taken into consideration. Of the 5 specimens removed by operation 1 was sarcomatous, 2 were softened, and in 2 there was no change. In 4 cases of myomata removed shortly after pregnancy it is important to note that the growths were necrotic and that the necrosis was no doubt due to the pregnancy. The manner of the change, whether it is due to uterine contractions during labor or to the anæmia of the puerperal uterus, is not known. Myomata rarely require operation on account of pregnancy. Six cases of the 23 were operated upon; 4 were radical operations for fibroids and 2 were conservative. The writer is in general in favor of radical operations for fibroids, but in pregnancy is inclined to a more conservative principle, because in 70 to 80 per cent. of cases reported pregnancy is undisturbed, because the mortality of about 300 reported cases is only 2 per cent., and because the symptoms for which operations are performed during pregnancy are cured as surely as symptoms from fibroids apart from pregnancy are cured by operation.

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[1] Monats. f. Geburts. und Gynäkol., Bd. xx., Heft 2.

Myomectomy during Pregnancy. Isolated cases of pregnancy continuing after myomectomy are frequently reported. Winter[1] studied the results of 10 cases of subserous myomectomy and of 58 cases of myomectomy for subserointerstitial tumors, the operations performed during pregnancy. Of the latter, 11 cases aborted. He places the infantile mortality at about 20 per cent. The operation being performed during pregnancy does not add to the maternal mortality. He is not an ardent advocate of myomectomy apart from pregnancy, and from his experience concludes that only 25 per cent. of the women who undergo myomectomy are satisfied with the results.

Extrauterine Pregnancy. It has only been with the gradual development of abdominal surgery that the relative frequency of this condition has been recognized. The profession in general has not exhibited that keenness and alertness toward extrauterine pregnancy which has characterized its study of appendicitis in the past few years. When that same attitude shall prevail toward obscure and hitherto little understood menstrual irregularities and pelvic pains we shall find the recorded number of ectopic gestations increasing.

The necessity of this attitude of suspicion is emphasized by Lemann,[2] for only by painstaking care will we be able to diagnose correctly the large proportion of cases which vary from the classical picture.

With the history of amenorrhœa for a month or two, accompanied by the usual signs of a normal pregnancy occurring in a woman previously sterile for a number of years, "this amenorrhœa being followed by a period of irregular bleeding from the genitals, the discharge of a decidual cast from the uterus, and occurrence of severe colicky pains in the lower abdomen, one would be led to the diagnosis of extrauterine pregnancy; and if upon vaginal examination the uterus should be found slightly enlarged, though not to the proper size for an intrauterine pregnancy of the indicated period, and further, if a boggy, fluctuating mass be found on one side pushing the uterus over to the other side, we have all the evidence in favor of our diagnosis. If shortly after such an examination we find the patient in collapse, with the signs of internal hemorrhage, we are further confirmed in our opinion by the occurrence of intraperitoneal rupture. But it is just these clean-cut cases which are of such rare occurrence. The symptoms of rupture may be the first to direct our attention to the possibility of any serious intra-abdominal condition. In such a case a cœliotomy is indicated no matter what the cause of the hemorrhage, and a differential diagnosis is not important. In such a case one would have to rely in the main upon the previous history for a diagnosis, as a pelvic examination would reveal little if anything, the mass having ruptured and the blood being free in the peritoneal cavity. The history of irregular bleeding following an amenorrhœa in a woman presumably pregnant, but who has previously been sterile for a number of years, leads to the consideration of the differential diagnosis from early intrauterine abortion.

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[1] Zeitschrift f. Geburts. und Gynäkologie, Band l., No. 3.

[2] Medical News, December 3, 1904.

"It is usually impossible to determine from the woman's story the difference between the early abortion and the decidual cast of extrauterine pregnancy. In both conditions the uterus may be slightly enlarged and hemorrhage may be intermittent or continued in both." The fact that the patient has been previously sterile or has had pelvic inflammatory trouble will not lend much weight to the side of tubal pregnancy as against intrauterine abortion, nor would the opposite history exclude the extrauterine gestation. A history of recurrent pains, whether sharp and lancinating, or bearing, boring, or dull and throbbing, more especially one or more spells of faintness, indicating partial rupture, will aid in the diagnosis.

A careful vaginal examination is of the greatest importance; there may be no pain or signs of rupture, yet in this quiescent state we may be of the greatest assistance. Examination may still leave the diagnosis problematical, but if we find a fluctuating mass in the broad ligament to one side with such a history we are justified in making the diagnosis.

The writer reports several interesting and abnormal cases illustrating his argument and condenses his belief regarding these cases as follows:

1. That the condition is a more frequent one than most of us now believe it to be.

2. That by maintaining an attitude of alertness and carefully investigating all conditions of menstrual irregularities and colicky pains, we shall find ourselves warranted in establishing an accurate diagnosis and saving the lives of some patients who would otherwise perish.

3. That when the diagnosis is obscure in the presence of a boggy or fluctuating mass to either side of the uterus, we are justified in doing an exploratory operation either through the abdomen or the vaginal fornix.

The relative value of the abdominal and vaginal route in operations for extrauterine pregnancy I have discussed in previous issues of PROGRESSIVE MEDICINE. Gradually the vaginal operation is disappearing as the operation of choice, especially in this country, where it has always had a limited following. The same may be said of drainage following cœliotomy for this condition.

REMOVAL OF THE SKELETON OF AN ECTOPIC FETUS ULCERATING INTO THE BLADDER. An unusual case of ectopic pregnancy is reported by

Haggard.[1] The patient, aged thirty-one years, had previously borne two children. She presumed herself to be normally pregnant. During the first three months there was a continual flow from the uterus, accompanied by a pain in the bladder with straining on micturition.

At six and one-half months while lying down she felt motion for the last time. After this she was confined to her bed for about four weeks with pain. The pain continued for about a year and she was a semi-invalid from weakness, pain, and tenderness in the lower abdomen. During this time the size of the abdomen gradually diminished. At the end of a year pus first appeared in the urine; the first day following its appearance a fetal vertebra was passed through the urethra. During the second year she attended all her household duties, but would have periods of unusually severe bladder irritation followed by the passage of a bone through the urethra. Sometimes one would stick in the urethra and she would catch hold of the free end and pull it out. In this way she passed eighty-five bones. Six weeks before her admission into the hospital she felt the discomfort of another bone and had not been free from it since, nor had any bone passed.

Examination revealed an exquisitely tender bladder, which crepitated upon pressure, the bones being covered by a phosphatic deposit. The urine was loaded with pus and phosphates, and exceedingly offensive. Micturition occurred every six or eight hours and was very painful. Frequently after urination free pus was often expressed. At operation under ether the index finger was passed into the urethra and detected many bones. An opening was found in the right upper surface of the bladder through which the finger was easily passed; a mass was palpated bimanually to the right of the median line and it was about the size of a small orange. An incision was made through the vesicovaginal septum and fifty-two bones were withdrawn by means of forceps.

Some bones were embedded in granulation tissue in the remains of the ectopic sac and were removed with difficulty. The sac and bladder were frequently irrigated and drainage established through an artificial vesicovaginal fistula. The bladder was irrigated twice daily with boric acid solution and the urine soon became normal. Six weeks after the first operation the fistula was closed by silver-wire suture and the patient made an uninterrupted recovery.

Ovarian Pregnancy. Ovarian pregnancy is a very rare condition, not more than twenty cases being recorded in literature. A short review of a study made by Webster[2] of such a case will therefore prove interesting from the fact of its rarity alone. The woman was aged thirty-six years, and had been married ten years. Menstruation began at eighteen;

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[1] American Journal of Obstetrics, November, 1904.

[2] Ibid., July, 1904.

it had always been regular and was of the twenty-eight-day type, and lasted from five to six days. She had been pregnant twice previously; the first pregnancy ended prematurely in the eighth month; the last went to term eight years ago. She menstruated normally July 4, 1903. Soon afterward the breasts became tender, firmer, and larger. Nausea gradually developed, and as there was no period in August she considered herself pregnant. September 7th she was taken with severe cramps in the abdomen. She had pallor and felt somewhat faint, but was able to walk to her home, where she went to bed. The pains were relieved by hypodermic injections of morphine. The following day blood escaped from the vagina, and continued about the same time as her normal menstrual flow. It contained clots and shreds of tissue. Colicky and labor-like pains were felt almost continuously, causing her to remain in bed. Morphine was frequently necessary. October 1st blood again appeared and the flow lasted several days. On October 6th her condition was as follows: Abdomen tender to pressure in the right iliac region; a bimanual examination revealed the uterus in good position, slightly enlarged and movable. The left tube and ovary were normal. On the right side of the uterus a mass larger than the uterus and distinct from it was easily palpated. This mass was tender to pressure and only slightly movable. Abdominal section was then performed and about half an ounce of dark fluid was found in the uterovesical pouch. The mass on the right side of the uterus was attached to the rectum and pelvic wall by many delicate adhesions. The right Fallopian tube was freely movable above the mass and was removed with it. The mass was immediately placed in hardening fluid. Webster describes the tumor as follows: An irregular, rounded mass measuring 8 cm. vertically and 7 cm. in its other diameters. The upper fourth is somewhat smooth and dull gray in color; the remaining portion is marked with knob-like elevations, varying in width from 3 mm. to 3.5 cm. These elevations are dark brown or purple, while the intervening depressions are much lighter in color. There was no indication of a rupture of the wall, or of any tubal abnormality. On section two portions were to be distinguished: a thin, peripheral layer and a large, medullary area. The peripheral layer formed a definite outer wall, concentrically striated, gray in color, here and there tinged pink, and containing many bloodvessels. The peripheral layer at its thickest part, at the upper portion near the junction with the broad ligament, measured 5 to 7 mm. In the lower part the thickness gradually diminished to 2 mm. The medullary area formed the main portion of the mass. Its appearance was mottled, presenting pink, red, brown, purple, gray, and yellow areas. Striation was everywhere seen, being irregularly or in parts radially marked. In the lower and outer portion, just external to the middle of the swelling, was a cavity (amniotic), whose lining was smooth and glistening and of a blue-gray color. It contained a few drops of turbid fluid and measured 2.2 cm. transversely and anteroposteriorly and 1.5 cm. vertically.

Microscopically, the peripheral layer was composed of connective tissue with the fibres running in all directions, though for the most part they are parallel to the surface and closely packed together. The connective-tissue cells were largely spindle-shaped, though some were round and oval. They corresponded in size to those found in the normal non-pregnant ovary.

"At intervals large, rounded, spindle, oval, or polygonal cells, varying somewhat in size, are found in the connective tissue. They possess usually a well-defined border, the cell substance presenting a more or less homogeneous consistence, in which under a high magnification a reticulated structure can generally be distinguished; the nucleus is large and stains deeply, the nucleolus being well marked. In some cases two nuclei are found, occasionally three. The cells in some cases have a hyaline appearance and their outlines are lost. They may be blended with other cells or with surrounding connective tissue, presenting hyaline degeneration. In these the reticulated structure may be lost; they may be vacuolated and the nuclei may be irregular or fragmented. These cells are mostly found in that part of the gestation sac near the hilum and in the layers nearest to the ovum and near large blood spaces. Away from the blood spaces few of these cells are found, and they are usually single."

What these cells were is difficult to determine; they resembled decidual cells closer than any other. It does not seem likely that they were wandering cells derived from the syncytium, because the nuclei were much larger and the cell substance is not so dense as that of the syncytium found on the chorion. Also in the majority of instances there was a definite cellular arrangement, the outline of each cell being well marked; they were not the irregular nucleated strands which are found invading the mucosa in uterine and tubal pregnancy. The cells were also much larger than those of the layer of Langhans in the chorion. There was some resemblance to wandering lutein cells, but the only portion of the corpus luteum found in the specimen was situated at a considerable distance from that part of the wall in which the large cells were chiefly noticed, and its cells were smaller than those under consideration and much degenerated; the characteristic yellow pigment of the lutein cells was also absent. Many of the cells resemble those found lining the wall of some blood sinuses, and in some parts seemed to be continuous with the latter, which appeared to be proliferated endothelium.

This extension around vessels of proliferated endothelium Hubrecht described as being characteristic of the changes in the mucosa of the hedgehog during early pregnancy. The appearance presented in certain parts of this specimen of ovarian pregnancy is somewhat suggestive of a similar change. "Small pieces of fetal syncytium are found in the thickest part of the sac wall. In most instances they appear to lie in spaces. There is very little indication of the invasion of the wall from the surface to which the ovum is attached. The syncytium and villi are found on the latter only at considerable intervals, a layer of thick fibrin formed from extravasated blood occupying the great extent of this area. The amnion was fairly well preserved. The chorionic epithelium consists of syncytium and Langhans' cells arranged in two or more layers. Degenerative changes are present. Buds of syncytium and villi are attached to the chorion and resemble those structures as they appear in uterine and tubal pregnancy. Between the chorionic layer and the gestation sac wall of ovarian tissue there is a large mass of tissue consisting of blood in various stages of alteration and chorionic elements—*e. g.*, villus stems, villi and masses of syncytium in various stages of degeneration."

Webster declares the topographical relations of this specimen to be beyond dispute. The ovum was situated entirely within the ovary. Both van Tussenbroek and Thompson believed that in their respective specimens the gestation must have begun in the ripe Graafian follicle. As there was no corpus luteum present in this case, if it developed in a Graafian follicle it was in one in which there was no formation of corpus luteum.

In the description of follicular development of ovarian pregnancy, it is usually assumed that the ovum is fertilized *in situ* in the follicle. This has not been proven, and in the absence of a corpus luteum in the wall of the gestation sac in this specimen it would seem that the ovum had developed elsewhere than in a ripe follicle. The feature of greatest scientific interest in connection with this whole subject is the method of the early embedding of the ovum in ovarian pregnancy. Webster, on phylogenetic grounds, believes that the fertilized ovum in the human female can only *begin* its development in tissue derived from the Müllerian tract. That Müllerian tissue does occasionally extend to the ovary the studies of De Sinety and Melassez, and especially those of Whittridge Williams, leave no doubt. Schmorl and others have directed attention to the occasional occurrence of small localized areas of decidua-like cells in the ovary in cases of uterine pregnancy. Out of ten specimens examined by the writer these changes were found in four. In each instance the areas were situated in the cortex at or near the surface, sometimes projecting from the cortex, sometimes extending for a considerable distance into it. The cells in these areas had the closest resemblance to the uterine decidua in normal pregnancy, and the line of demarcation from the surrounding ovarian stroma is always well marked. These areas also contain dilated bloodvessels, which are not found in the neighboring unchanged ovarian stroma. These areas he has never found in the ovaries removed from non-pregnant women. These cortical localizations of decidua-like cells in the ovary of pregnancy suggest some special characteristic which makes the cells capable of undergoing the same genetic reaction which is ordinarily found in the uterine and tubal mucous membrane when pregnancy develops in relation to these tissues. Tentatively he advances the view that these areas represent detached portions of Müllerian tissue which have become attached to the surface of the ovary. Occasionally he has found in the substance of such an area a gland-like space lined with columnar or cubical epithelium. The latter may be only a derivative of the surface germinal epithelium, but it may represent included Müllerian epithelium. The special genetic action in these areas may sometimes determine the embedding and growth of a fertilized ovum in the ovary, and if they be Müllerian in origin all cases of ovarian pregnancy would support the dictum that the fertilized ovum in the human female begins its development in Müllerian tissue. The proof of this is impossible, but all *a priori* evidence is in its favor. Admitting that no definite decidual layer was found in the specimens considered in this discussion, we do not know that they were not present at a much earlier period. Webster believes that, although no definite layer of decidua is found in his specimen, there is little doubt that the scattered groups of large cells found in the ovarian stroma, nearest the ovum, were decidual in character.

He concludes with the statement that for several years he has held the belief that decidual transformation is peculiar to the Müllerian tract. The occasional presence of areas of decidua-like cells in the ovary in pregnancy has been cited as an exception, but it remains to be proved that these areas are not Müllerian in origin. Small localized decidual nodes have also been found in the broad ligaments. These he believes are also derived from detached portions of Müllerian tissue which are quite common in the upper portion of these ligaments. Similar areas have also been found under the peritoneum of the pouch of Douglas, and these may also be detached portions of Müllerian tissue.

Pyelitis Complicating Pregnancy. Pyelitis complicating pregnancy is a comparatively rare condition, but it is of sufficient frequency to require a thorough study and clear recognition. Cragin[1] says that a pain in the right side of the abdomen accompanied by tenderness arising during pregnancy is frequently due to pyelitis. Two factors tend to produce it: a compression of the ureter by the enlarged uterus, and an infection of the urinary tract above the compression. As the urine is secreted under very low pressure, moderate compression will shut off the flow through the ureter. The right kidney is most commonly affected. As to the source of the infection, it is usually the colon bacillus. This organism was found to be the cause of three of the author's cases. Pyelitis usually occurs between the fifth and eighth months. The diagnosis may be made by a tenderness in the region of the kidney, elevation of temperature, and acid urine containing pus. Appendicitis, typhoid fever, and salpingitis are the three conditions most likely to be confounded with pyelitis. Palpation of the abdomen in advanced pregnancy is often difficult, and the tenderness may correspond closely with McBurney's point. The history of the case and a bimanual examination will usually enable one to differentiate between pyelitis and salpingitis. Typhoid fever is to be recognized by the clinical history and the Widal test.

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[1] Medical Record, July 16, 1904.

The treatment should consist of rest in bed, a liquid diet, with a free, copious ingestion of fluid. If the pain is severe an ice-bag may be applied over the kidney; if this does not give relief a small amount of an opiate may be given. Should this treatment not give relief and the pain becomes more severe with higher temperature, a surgical operation may become necessary. Termination of the pregnancy for this cause is seldom if ever necessary.

Severe Hemorrhage from the Bladder during Pregnancy. Kubinyi[1] reports a case of this character and believes that he has to deal with a condition analogous to the bleeding of hemorrhoids. The patient was discovered to have a greatly distended bladder. Catheterization was tried, but failed to relieve it. He then dilated the urethra to admit a finger, when it was found that the internal meatus was occluded by a blood clot. As the finger was removed a large amount of blood and urine gushed out. After emptying the bladder a closer inspection revealed varicose veins of the legs; a cystoscopic examination of the bladder was then made and the same condition of the mucosa of the bladder was found; anterior and above the neck of the bladder was found a large, horizontally directed vessel which was surrounded by clouded mucosa. This the author believes was the source of the hemorrhage. Schroetter believes that the varicosity is due to an increased blood pressure in the vein and to an insufficiency of their valves. The author attributes the increase in blood pressure in his case to lifting done by the patient, which was followed by the bleeding. Such hemorrhages may at times be of such a severe character that cystotomy and packing will have to be resorted to.

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[1] Centr. f. Gynäk., 1904, No. 98; American Medicine, January 14, 1905.

Thrombosis of the Internal Iliac Vein during Pregnancy. The rarity of thrombosis of the vessels of the lower extremity during pregnancy and the unsatisfactory and scanty reports of its etiology have led Goldsborough[1] to report a case which occurred in the hospital service. The writer was only able to collect 10 cases in the literature; of these, 3 were lacking in many important details. In the cases of Bonnet-Laborderie and Gripat the thrombosis occurred in both legs. In the former the left internal saphenous vein was affected, while the location of the lesion in the right leg was not stated, the author designating the condition as spontaneous phlebitis. In the latter, the right femoral vein was thrombosed, but no mention was made as to which vein was involved on the left side. The author ascribed the condition to toxæmia of pregnancy, associated with chronic anæmia resulting from paludism. Of the 5 cases in which only one leg was affected, the left femoral vein was involved in the patients of Brindeau, Audebert, Saint-Ange, and Bacon, while in Beaudry's case the right saphenous vein was the seat of the lesion. In no instance was the etiology clear. In 2 cases pregnancy terminated spontaneously at the fifth and eighth months, in 6 the patient went to term, and in 2 no information regarding this point was available. Only 2 of the cases suffered from fever, and all recovered with rest and immobilization of the affected parts. Goldsborough's case occurred in a white woman, aged twenty-nine years, who was admitted to the obstetrical department complaining of constipation, nausea, vomiting, and swelling of the left leg. She was in the ninth month of her first pregnancy, the course of which had been practically normal until four days before admission. She had attended to her work until one week before admission and she thought was able to conceal her condition by a specially constructed corset which compressed her abdomen. A week before entering the hospital she was compelled to go to bed on account of marked œdema in her left leg. Her bowels did not move during this period and four days later she began to suffer from nausea and vomiting. The uterus was seen to be deflected to the left side and it reached to the costal margin; the child lay in the right occipito-iliac transverse position. The patient's left leg was enormously swollen from the toes to the groin; the skin was white and glistening and pitted on pressure. Thrombosed vessels could be palpated in the groin and at the saphenous opening. The pulse was 80 and well sustained with moderate tension. There was no sugar or albumin in the urine. Her bowels were opened, but the nausea and vomiting continued during the succeeding forty-eight hours, and it was determined to induce labor. A De Ribe bag was inserted at 5 P.M.; four hours later pains started and gradually became more effectual; the bag burst at 3 A.M. the following morning and the pains gradually disappeared. At 10 A.M. the cervix was dilated by Harris' method and the child delivered by version; the placenta was removed manually and a lacerated perineum repaired. She died fifteen hours after delivery. At the autopsy the lumen of the left common iliac vein was completely occluded where it was crossed by the right common iliac artery. From this point as far down as the dissection was carried, the vessel was filled by a thrombosed mass which extended into the external iliac and from it into the femoral and saphenous veins. The vein was perfectly normal above the point of compression. Cultures taken from the heart's blood and from the thrombus at the time of the autopsy were absolutely negative; nor could the most thorough examination of stained, hardened specimens reveal the presence of bacteria. These negative results would seem to eliminate the possibility of a bacterial origin. After considering all the possibilities the writer concludes that the cause is to be found in the corset which brought the pressure to bear at the point where the vein and artery crossed. As pregnancy advanced and the pressure increased the lumen of the vein was completely obliterated, with stagnation, coagulation, and thrombosis following in order.

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[1] Johns Hopkins Hospital Bulletin, June, 1904.

Pregnancy following Operations for the Correction of Displacement of the Uterus. The choice of operation for women during the childbearing period of life has in recent years been largely influenced by the results upon subsequent pregnancy and the effect of pregnancy and parturition upon the permanency of the operation. These questions are increasing in importance since conservative surgery upon the appendages has become a fixed principle at the hands of most gynecologists. Our aim now is to save for the woman when possible her procreative function, and operations to correct retrodisplacement are very commonly associated with plastic and conservative work on the appendages and thus have an added interest when studied in their relations to pregnancy and labor. Hoyd[1] reports a series of cases of the Alexander operation for the relief of sterility. In 12 cases followed by pregnancy the uterus remained in perfect position at periods of examination varying from two months to five and a half years. Beyea[2] studied the results in 465 cases of retroversion treated by a method of ventrosuspension designed especially to avoid complicating pregnancy, and declares that it has never complicated labor nor produced an abortion. Of the patients whose subsequent histories were traced 153 were married and 41 have been pregnant since the operation, of whom 37 were delivered of living children at term. Five have had two children; 9 have aborted, 5 doing so twice, and all before the sixth month. Holden[1] reviewed the results of 445 cases of ventral suspension done in the Johns Hopkins clinic. He says that the great majority bore no symptoms during pregnancy or labor referable to the operation, and the only adverse symptom is abdominal pain during pregnancy. Recurrence of the displacement may occur after labor, but does not necessarily follow. If labor does not intervene the proportion of recurrences is not more than 5 per cent. L. F. Garrigues[2] reports 12 pregnancies following vaginal fixation performed on 120 cases; there were 3 abortions, and of these 1 patient subsequently carried the pregnancy to term. All labors were normal. V. Guerard[3] reports 51 normal deliveries in 57 labors following ventrofixation. Five cases required forceps. In 41 labors after vaginal fixation 39 were normal, the forceps at the outlet being used in 4 cases.

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[1] American Journal of Obstetrics, November, 1904.

[2] University of Penna. Med. Bulletin, November, 1904.

The frequent reports of isolated cases of complications during pregnancy and labor do not apparently entirely agree with the above excellent showing. That these operations do interfere with the course of pregnancy and labor is further attested by the growing popularity of the round-ligament operations, either through the inguinal canals or the abdominal incision. The dangers are unmistakably greater after *fixation* and are diminished by a technique that avoids or prevents that result, but it is a significant fact that, except at the hands of a few operators, utilization of the round ligament is growing in favor as a means of correcting backward displacement, and especially where subsequent pregnancy is expected to occur.

Operations during Pregnancy. Many conditions may complicate pregnancy which at the present time are submitted to surgical treatment never attempted in the past or undertaken with an anxiety not felt at the present day. Intra-abdominal complications, such as appendicitis, ovarian and other tumors, now serve as indications for prompt surgical treatment during pregnancy.

J. C. Webster[4] has reviewed the various conditions that call for operation during pregnancy. Incarceration and impaction of the gravid uterus, accompanied by old and dense adhesions, should not be subjected to the risk of forcible manipulation to secure replacement, but as an alternative to inducing abortion abdominal section and careful release of adhesions are to be considered.

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[1] American Journal of Obstetrics, April, 1905.

[2] International Journal of Surgery, November, 1904.

[3] Monatsschrift f. Geb. und Gynäkologie, xix., No. 2.

[4] Illinois Medical Journal, April, 1904.

Pregnancy occurring in a uterus bound down by old inflammatory masses, accompanied by tenderness and a history of previous abortions, indicates the same treatment. Complications in the urinary tract may demand prompt surgical treatment. A stone in the bladder should always be removed, and pyonephrosis calls for surgical treatment or the termination of pregnancy. Pyelitis or ureteritis not accompanied by enlargement do not usually demand surgical treatment. Intra-abdominal bleeding from any source calls for immediate operation to control the bleeding. Tumors of the vulva—hæmatoma, cyst, or abscess—may be removed with safety. The last is a danger of infection after labor that should be removed. Non-interference in cases of appendicitis is more dangerous than operation, and a woman who has had an attack should have her appendix removed before she becomes pregnant.

Obstruction of the bowels, of course, may demand surgical relief independent of the pregnancy when the latter is present. Webster advises surgical operations for gall-bladder disease complicating pregnancy only when the conditions are urgent. His advice as to fibroids and ovarian tumors coincides with what we have noted above as to their complications. Operable carcinoma of the rectum calls for emptying the uterus and later removal of the malignant disease. When inoperable the pregnancy should be allowed to continue and Cæsarean section done at term.

LABOR.

The Act of Labor Observed on the Isolated Uterus. Some very interesting physiological and pharmacological experiments have been recorded by Kurdinowsky.[1] They were made upon the isolated uterus and have to do with the act of labor. The uterus of a rabbit with the adnexa was removed under ether narcosis after having previously injected it from the aorta with Locke's fluid, thus removing all the blood. The organ was then placed in a specially prepared chamber and kept moist with Locke's fluid. The uterus retained its responsiveness to stimuli for two or three days. In two cases the writer was able to observe the act of labor in a pregnant rabbit uterus from beginning to end. The wave of contraction begins at the cornua and progresses toward the body of the uterus, thus resulting in the separation of the embryo from the uterine wall. When separation has taken place the embryo is slowly pushed from the cornu into the body of the uterus; this act is accomplished simultaneously in both cornua. Ring-like contractions then begin in the body of the uterus and the fetus is gradually pushed into the vagina. The broad ligaments take an active part in the contractions which force the fetus into the vagina, and so soon as this has been accomplished they cease their activities. This experiment seems to show that the uterus can perform its expulsive function in itself without any stimulus from the central nervous system. The uterus was stimulated in various ways, and it was found that heat and chemical stimuli strengthen the contraction, but in so doing often make them tetanic in character. Electric stimuli had very little effect. Ergot affected the uterus in a peripheral manner, and produced contractions independent of any contractions of the vessels. Narcotic poisons, such as chloral and alcohol, have little effect. Adrenalin in very dilute solutions was found to increase the uterine contractions more than the so-called specifics and should be further studied in this relation.

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[1] Archiv f. Gynäkol., vol. lxxiii., No. 2.

Antepartum Measurement of the Fetal Head. At a meeting of the New York Obstetrical Society, December 13, 1904, Dr. W. S. Stone[1] made a preliminary report upon the method of measuring the fetal head with the ordinary pelvimeter. The two poles of the fetal head, the occipital and frontal, are first palpated in the ordinary manner to locate them. An assistant standing at the foot of the table places the ends of the pelvimeter between the ends of the ring and middle fingers of the palpating hands and presses them in as the one who is palpating directs and reads off the measurement upon the scale. He has now collected 42 cases in which this method has been tried, and the measurements compared with the occipitofrontal measurements after delivery. In 27 cases the measurements were exactly right; 13 showed an error of 0.25 cm.; 2 showed an error of 0.50 cm. Further measurements will be taken and presented with detailed reports of the cases.

Significance of Fever during Labor. The fever of labor had not been studied to any extent until within the last few years, when Vinay and Ravon made important investigations. Cumston[2] has reviewed this question. It is not a frequent complication, and Vinay says that if the rectal temperature be taken several times during labor upon women about 3 or 4 per cent. of them will be found febrile. There are two different forms of the fever, a slight and serious form. The slight form is, in the majority of cases, due to the result of a long labor, the membranes having been ruptured for several hours and dilatation being incomplete. The temperature in this class varies between 100.4° and 102.5°, and is about the only pathological symptom present. There is no chill and the pulse rate is in relation to the temperature. The patient's appearance is normal, and with the end of expulsion the temperature reaches normal and does not rise again during the postpartum period.

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[1] American Journal of Obstetrics, February, 1905.

[2] New York and Philadelphia Medical Journal, October 1, 1904.

The serious form is ushered in by a sudden, violent, and prolonged chill, accompanied by vomiting, agitation, and general malaise. The rectal temperature reaches 104° or above that. The pulse is rapid and more or less irregular. Usually the membranes are unruptured and dilatation is incomplete. The general condition becomes progressively worse, and by palpation during the intervals of pain the uterus will be found painful and contracted. Vinay calls particular attention to this tetany of the uterus during labor and to the exaggeration of the pains, which are constant symptoms. When labor ends the temperature does not fall, or, if it should incline to fall, goes up again in a few hours. There is great thirst, dry tongue, a leaden hue, and an anxious expression of the features; the general condition becomes serious and often ends in death. That this fever is infectious is certain, but how are the pathogenic bacteria introduced? A period of incubation of several days is required before the symptoms appear, and in many cases no vaginal examination had been made before the beginning of labor. The penis of the husband should then be suspected as the transporting agent of the bacteria. Ravon reports three cases in which a recent coitus was certainly the cause of contamination. In one sexual intercourse had taken place two days before labor, in the second four days previously, while in the third it had occurred the night before. Vinay points out that "it is sufficient to recall the filthiness of the genital organs of certain men in order to realize the possibility of infection by this means, and if it is admitted that the finger of the obstetrician can be the agent of infection, one can hardly deny that the penis can exert the same influence." The importance of this etiological factor is so great that in the obstetrical clinic at Leipzig, among other questions put to patients, is that of the date of the last coitus.

In the milder form of these cases the prognosis is good for both mother and child. The fever and other symptoms disappear with the birth of the child or a few hours after, and in general do not recur during the postpartum period. The severe type has a much graver significance, for in reality it is a precocious puerperal septicæmia, with all its inherent dangers and complications. The only prophylactic treatment which can be of benefit is to advise the husbands to refrain from sexual intercourse with their wives during the latter months of gestation, and the strictest observance of a rigid asepsis by the obstetrician when he considers it absolutely necessary to make a vaginal examination before or during labor.

In the conduct of the milder form of these cases there is no reason for interfering. Rigorous antiseptic precautions should be taken, and if the second stage be too long delayed and the patient shows evident signs of exhaustion, with an increase in the height of the fever, with her general condition poor, and the child beginning to suffer, the labor should be terminated. This is an absolute indication when there is an infection of the amniotic fluid, with a temperature above 102.5°, with a rapid pulse, general weakness, and great tenderness of the uterus. Labor should be terminated in the interest of both mother and child in the manner called for by the indications present.

Preventive Treatment of Pelvic-floor Lacerations. The prevention of lacerations of the structures constituting the pelvic floor during labor is considered by some writers as only secondary in importance to the preservation of the lives of the mother and child. Edgar[1] believes that deep lacerations are avoidable in normal, ordinary cases of labor, and that the great importance of avoiding rupture of the pelvic-floor structures cannot be overestimated. It is a well-known fact that many gynecological cases owe their origin to lacerations of the pelvic-floor structures during labor. Pelvic-floor injuries comprise ruptures of the fourchette, posterior vulvar commissure, perineum, the lower third of the anterior, posterior, and lateral vaginal walls, and rectovaginal septum.

The results of ten years' observation in the obstetrical clinic at Halle, of every known method for protection of the perineum, show in primipara that 21.1 per cent. suffered lacerations extending beyond the commissure, and in multipara 4.7 per cent.

The factors which tend to produce, directly or indirectly, pelvic-floor lacerations are: 1. Too rapid expulsion of the fetus, causing tearing instead of stretching of the pelvic-floor tissues. 2. Relative disproportion in size between the presenting part and the parturient outlet. 3. A faulty mechanism of labor, whereby a larger circumference of the head and shoulders than necessary passes through the parturient outlet.

From his extended clinical experience the writer recommends: 1. The preliminary digital stretching of the vulvar outlet in primiparæ, and especially in elderly primiparæ, as a prophylactic measure in perineal protection. This he performs by passing two fingers of one hand, palmar surfaces down, into the parturient outlet and making intermittent backward and lateral, massage-like pressure. The motion is a sort of eccentric massage. Fifteen to twenty minutes of this firm backward and outward, rotary, massage-like stretching will usually sufficiently enlarge the most rigid parturient outlet. The best results are obtained with the use of ether or chloroform. There are, of course, certain kinds of pelvic-floor rigidity that will resist this and every other method of prophylaxis.

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[1] American Journal of Obstetrics, July, 1904.

2. Episiotomy. He offers nothing new under this head, believing that the greater the clinical experience the more infrequently will the operation be required.

3. Head Delivery. The practice is to have the delivery of the head so slow that stretching of the parts and not tearing will take place. Delivery of the head is secured in the interval between the uterine contractions because the pelvic-floor muscles are relaxed to their greatest extent at this time.

4. Cleidotomy. Division of both clavicles in dead fetuses as a preliminary to delivery of the shoulders has for its object the lessening of the bisacromial diameter. The writer believes that this operation has never taken its proper place in obstetric surgery as a valuable means of lessening maternal morbidity and mortality. In those cases brought into his hospital service where delivery has been impossible on account of the wedging of the shoulders, and in other accidental cases where the shoulders still remain within the pelvis, he divides the clavicles as a routine measure and says it is amazing how the diminution of the bisacromial diameter thus produced renders the subsequent extraction of the fetal shoulders a comparatively easy task. In his experience the operation reduces the bisacromial diameter from four and three-fourths inches to four inches, or from 12.7 cm. to 7.5 cm. For the operation a pair of heavy straight or curved obstetrical scissors of the Dubois type is used, two fingers of one hand being used to guide the blunt points to the middle of each clavicle. The fetal head should be flexed to one side strongly to give room for the use of the scissors.

5. Shoulder Delivery. It is his belief that the posterior shoulder is responsible for many cases of deep pelvic-floor laceration, and that many cases of moderate lacerations caused by the head are often increased by the subsequent passage of the posterior shoulder. The writer found that when the head was lightly supported the posterior shoulder was born three times as often as the anterior in 69 primiparæ and two and a half times as often in 68 multiparæ, and further that the posture of the woman did not appear to affect the mechanism of shoulder delivery. The method employed for shoulder delivery is as follows: (*a*) Delay the delivery of the shoulders if possible until nearly complete rotation of the bisacromial diameter has taken place. (*b*) Take the fetal head in the hand and gently elevate it until the anterior shoulder is brought up well behind the symphysis, thus bringing the cervicoacromial diameter into the outlet instead of the bisacromial. (*c*) The posterior shoulder is now allowed to pass out spontaneously, and whenever possible manual extraction should be avoided, thus decreasing the risk of perineal rupture. (*d*) While the anterior shoulder is held behind the symphysis the fetal hand of the opposite arm will usually soon appear

in the vulva lying across the chest. This forearm should now be slowly flexed out through the vulva, thus delivering the posterior shoulder by slight traction on the posterior arm. (*e*) Should the foregoing procedure be impracticable and should delay occur in the delivery of the posterior shoulder, gentle traction upon the head, the fingers encircling the neck, is preferable to traction with a finger in the axilla. (*f*) Should there be delay in the delivery of the anterior shoulder after the posterior is born, make traction directly downward with the hands placed on the sides of the head, taking care not to make too great pressure upon the perineum. As a last resort traction may be made by a finger in the axilla.

Anæsthetics. CHLORIDE OF ETHYL IN OBSTETRICS. The use of chloride of ethyl in obstetrics is described by Plauchu.[1] He has administered it in 40 obstetrical cases as follows: 10 c.c. of the drug are sprayed into a compress of gauze folded into eight thicknesses. The compress is hollowed in the hand or folded in the shape of a funnel and placed over the nose of the patient. The patient is instructed to breathe deeply and narcosis takes place in about one minute.

The writer used the drug as an exclusive anæsthetic, also as a preliminary to a more prolonged general anæsthesia. It was used in painful obstetrical examinations, also in the application of forceps, the rapid extraction by breech, and version. Its administration was followed by comfort. My experience coincides with the above report in regard to the use of this drug in instances where a temporary anæsthesia is required, such as in painful examinations and at the end of the second stage of labor. Where deeper and prolonged anæsthesia is required ether is preferred. Merck's chloride of ethyl has proven the most dependable.

SPINAL ANÆSTHESIA IN OBSTETRICS. The constant experimenting with different drugs and modes of administering them is evidence that spinal anæsthesia has not yet reached a degree of success sufficient to warrant its general use in obstetrics. This is also the opinion of Clark[2] who reviewed Stolz's work in the June number of PROGRESSIVE MEDICINE, p. 220.

Martin used Bier's method of lumbar anæsthesia in over 30 cases and reports his results.[3] He used a solution which was made of a combination of *adrenalin and cocaine.* 1 c.c. of an adrenalin solution (1:2000) was injected into the spinal canal under Schleich's local anæsthesia. Five minutes later 0.8 to 2 c.c. of a cocaine solution was injected. In only one case was anæsthesia confined to the genital organs alone. In the other cases complete anæsthesia, usually extending up to the lower ribs, was obtained. In some cases the whole trunk was rendered analgesic. The duration of the anæsthesia varied from half an hour to four hours. It was his experience that pregnant women bore spinal anæsthesia very well, and he concurs with Stolz in respect to the after-effects not being bad or disagreeable. Severe vomiting occurred occasionally, but there were no rigors with rise of temperature in any case. Tuffier's method of controlling the untoward effects of the anæsthesia by subcutaneous injections of caffeine-sodium-salicylate did not appear of any benefit in his hands.

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[1] Annals of Gynecology and Pediatrics, 1904, No. 9.

[2] Archiv f. Gynäk., 1904, Band lxxiii.

[3] Münchener med. Wochenschrift, October 16, 1904.

This form of anæsthesia, it was noted, impaired the activity of the uterus both as regards the number and force of the contractions. The bearing-down pains were especially affected, for the abdominal muscles were only brought into play when the patient was urged to do so. When the labor was completed within one and one-half hours after the injection there was scarcely an unpleasant sensation during the whole process of delivery, even though it necessitated the use of forceps. The processes of involution and lactation were in no way interfered with. It is Martin's belief that this method of anæsthesia should not displace chloroform in private practice. Further experimental experience he believes will teach that it produces no harmful results.

Several writers, among them Chaput, claim that stovaine has certain advantages over cocaine in intraspinal injections. Stovaine dilates the vessels, slows the pulse, does not tend to cause syncope, and permits of operations being performed while the patient is sitting up. It is said to be less toxic than cocaine and can therefore be employed in larger doses. Occasionally after-affects are a slight headache and backache, with a slight rise of temperature. Chartier[1] presents the details of 11 cases in which he has used *stovaine.* He used a 10 per cent. solution made up with sodium chloride. He injected 5 to 8 drops—*i. e.*, 2½ to 4 cg. of stovaine. Complete anæsthesia was obtained in from six to eight minutes after injecting the solution and lasted from three-quarters of an hour to one hour. Stovaine like cocaine acts as an oxytocic. There is no danger of tonic contraction if the dose is not larger than 2 to 5 cg., and this dose may be repeated if necessary. Injection of stovaine for surgical purposes is of course contraindicated in pregnant women. The fœtus apparently did not suffer from the toxic effects of the drug. No immediate bad after-effects were noted in the mothers. In 6 out of 11 cases, however, the patients suffered later from more or less violent headache, chiefly frontal, pains in the eyes and spine, giddiness, nausea, and vomiting. These phenomena, while never alarming, persisted until the eleventh day in two patients. Quinine was found to be the most useful drug in the treatment of these symptoms.

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[1] La gynecologie, October, 1904; Journal of Obstetrics and Gynecology of the British Empire

Accidents of Labor. TREATMENT OF ACCIDENTAL HEMORRHAGE. This subject was fully treated by Macan.[1] He describes it as arising from accident, from disease, and from some failure in the mechanism of labor. As regards the mechanism of this condition he finds that the healthy uterus cannot be distended to any considerable extent by blood pressure. The placenta has great power of accommodating itself to changes in size of its site, and is not so easily separated as the membranes. Gravity and peristaltic action of the uterus need not be considered. The hemorrhage in spreading follows the line of least resistance

Accidental hemorrhage is caused by increased action of the heart, obstruction to the return of venous blood to the uterus, disease of the uterine vessels, sudden lessening of intrauterine tension, and diminution in size of the placental site. When the heart action slows, the tendency of the hemorrhage is to stop; increased intrauterine tension from effused blood or intrauterine contraction or adhesions also tends to stop the bleeding. The formation of thrombi produces a like result.

On the other hand, increased heart action, fresh separation of the placenta, diminished coagulability of the blood, a very rapid flow of blood, with adhesions between the placenta and membranes to the uterine walls, tend to increase the bleeding. Diminished intrauterine tension has an important bearing, and may arise from the giving way of the uterine walls, the absence of uterine contractions, blood escaping from beneath the placenta, or rupture of the membranes. Where hemorrhage is but slight and from the centre of the placenta it may remain internal. Adhesions between the placenta and membranes or wall of the uterus, distensibility of the uterine wall, and the presenting part acting as a plug tend to cause the hemorrhage to remain internal. When these conditions are not present, especially when the bleeding begins near the margin of the placenta, blood will escape externally. It is very important in these cases to consider the effect of rupturing the membranes and the effect produced by contractions of the uterus on the hemorrhage. Rupture of the membranes lessens intrauterine tension and tends to increase hemorrhage. Uterine contractions do not cause hemorrhage to stop, for it is not the contraction of the womb but its retraction which controls bleeding. Uterine contractions may cause hemorrhage when the contraction ring is high in the abdomen and the site of the placenta is lessened, when there is delay in the birth of the after-coming head, or when a shoulder presentation is neglected.

After the birth of the first of twins, or where excessive amniotic liquid escapes, the uterus often contracts, but does not retract, and hence hemorrhage arises. During a contraction hemorrhage is arrested if the supply of blood is cut off and intrauterine tension is increased.

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[1] British Medical Journal, 1904, No. 2286.

As regards diagnosis we cannot distinguish between a low insertion of the placenta with bleeding and external accidental hemorrhage.

In recognizing internal hemorrhage, when symptoms of shock with abdominal pain are present, we must suspect hemorrhage, but frequently we cannot diagnose it until after the expulsion of the placenta. When the hemorrhage is concealed we appreciate its nature from the fact that the symptoms are out of all proportions to the quantity of blood lost. It is of great importance to know if possible how much of the hemorrhage is internal. Regarding treatment, we may be able to prevent this accident by curing endometritis, by lessening arterial tension and venous congestion, by dealing with nephritis, and by giving remedies which shall increase the coagulability of the blood. In the treatment of the hemorrhage itself we try to arrest the hemorrhage without emptying the uterus if possible. This may be attempted by placing the patient at absolute rest, giving opium, and lessening congestion by salines. The escape of blood may be prevented by firmly tamponing the vagina or cervix and by making firm pressure on the uterus either by the hand or with the vaginal tampon and abdominal binder; aided by a perineal compress and bandage we may increase uterine tension, thus causing the hemorrhage to cease; measures which retard the flow of blood help in the formation of thrombi.

Macan believes in tamponing by the Rotunda method as follows: Sterilized cotton-wool, in masses the size of a large walnut, soaked in an antiseptic solution is used. After cleansing and catheterizing the patient the fingers of one hand are used as a speculum; the tampons are wrung dry and packed firmly about the cervix. This is done as tightly as possible and until no more can be introduced into the vagina. A large strip of iodoform gauze is then placed over the tampons, projecting from the vagina and forming a firm perineal pad. A strong binder is firmly pinned from above downward, starting above the fundus, and to this is added a firm perineal bandage, the whole making very tight compression.

The after-treatment consists of warmth, warm liquid food, and one-half grain of morphine hypodermically; the physician is notified if uterine contractions begin, if the perineal pad begins to bulge, if hemorrhage comes through the dressings, or if the patient grows faint. Of 43 cases so treated 2 died: 1 (undelivered) from hemorrhage, the other from rupture of the uterus. In conducting labor in these cases the membranes must not be ruptured if possible. If pains become vigorous, the perineal bandage and part of the tampons should be removed. The contractions of the uterus will force out the remainder and the membranes should not be ruptured until full dilatation has been secured.

In summing up his paper Macan says that from his personal experience he is entirely in favor of performing Cæsarean section in these cases in preference to rapid dilatation of the cervix, and would be in favor of vaginal Cæsarean section. He believes that rupture of the membrane is not good treatment of this condition, unless it causes rapid expulsion of the child. Where during labor the membranes persist unbroken in the second stage and hemorrhage begins, such bleeding is immediately controlled by rupture of the membranes and the termination of labor.

Galabin has seen accidental hemorrhage completely internal from partial degeneration of the placenta with a living fetus. He believes that rupture of the membranes is followed by increased intrauterine tension and hence that it tends to diminish hemorrhage. He did not find, on examining the statistics of the Rotunda before treatment by tamponing was introduced, a very great improvement in the mortality. He thought Cæsarean section might in some cases increase shock to a fatal issue. Kerr, of Glasgow, has observed a mortality of 20 per cent. in these cases, with an infantile mortality of 95 per cent. In some cases the hemorrhage ceases spontaneously, no other treatment than rest being given. If the operator decides to rupture the membranes a foot should be brought down in addition. In severe cases Kerr thought Cæsarean section was clearly indicated.

Byers was also in favor of Cæsarean section in concealed accidental hemorrhage. In cases where the hemorrhage was external with absence of labor pains, he believes in the method of tamponing described by Macan. He called attention to statistics from the Rotunda of 56 cases where forcible delivery was employed in serious conditions with 6 deaths. In a second series of 57 cases where forcible delivery was not done, but tamponing was used instead, there was but 1 death. In the last two reports from the Rotunda there were 34 cases without a death. Nicholson had seen good results from dilating the cervix and emptying the uterus, and especially with the use of bipolar version. Ergot, quinine, and digitalis had given good results after the delivery of these patients. Continuous hemorrhage from the lower uterine segment after delivery was best treated by tamponing with iodoform gauze wrung out of adrenalin solution. The administration of saline solutions was also useful in these cases.

Placenta Prævia. The etiology and treatment of placenta prævia are discussed by Sinnetamby.[1] According to Sinnetamby, Peters' description of the formation of the decidua reflexa is the one generally accepted. The ovum after reaching the uterine cavity rapidly changes into the compact layer of the uterine decidua by the phagocytic action of the trophoblast. The excavation is made deeply and laterally; the deeper the excavation, the thicker the reflexa, especially the basal portion.

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[1] Journal of Obstetrics and Gynecology of the British Empire, September, 1904

The functional activity of the villi of the chorion is believed to depend upon the vascularity and thickness of the deciduæ that surround it. If the lower reflexa fulfils this function a reflexal placenta results, which finally becomes united with the decidua vera of the cervical zone unless rupture and hemorrhage provoke premature expulsion of the ovum. This is not the only mode of formation of the placenta prævia. Webster has exhibited specimens of placenta prævia of serotinal origin, and has drawn the conclusion that only a low implantation of the ovum could explain the serotinal origin of a placenta prævia.

Sinnetamby believes that while this may be true in a good number of cases where the placenta is entirely serotinal and is wholly implanted in the lower segment, it cannot be so in cases having the characteristics of Webster's specimen, for this shows placentæ of serotinal as well as reflexal origin. This he believes can only be explained by the ovum having entered the compacta in the usual manner, and working its way downward between its layers until it reached the lower zone. "The ovum is usually fertilized in the Fallopian tubes, and by the time it reaches the uterus its trophoblast becomes functionally active, and it at once burrows into the mucous membrane of the fundal portion of the uterus. But should the functional activity of the trophoblast be delayed until the ovum reaches the lower uterine segment owing to late fertilization, it is not unlikely that the ovum would attach itself in that zone with the formation of a serotinal placenta prævia. An ovum devoid of trophoblast cannot attach itself and will be carried away by the ciliary current, in the absence of any intrinsic motile powers of its own, from the Fallopian tubes down to the cervix." In the reflexal variety the growth of the ovum stretches the reflexa, which may give way and produce hemorrhage and abortion, or the accident may occur by the chorionic villi becoming very active and rendering the reflexa weak and liable to rupture. This accident generally occurs before the fourth month, before the reflexa meets the vera. If the reflexa escapes this accident it becomes blended with the vera, which may be partial or complete. If there is no complete blending of the reflexa and vera the reflexa may give way and produce hemorrhage any time between the fourth month and full term. In the latter pregnancy may go on until interrupted by the separation of the placenta consequent on the canalization of the cervical canal and descent of the ovum.

"In the serotinal variety the hemorrhage is due to the separation of the placenta during dilatation of the cervix. Hemorrhage may then occur at any time during the course of pregnancy, and some of the unrecognized cases of abortion and accidental hemorrhage are due to this abnormality."

The mortality in placenta prævia is high. The maternal mortality varies from 15 to 40 per cent., while the fetal mortality is much higher. According to Galabin it is 60 to 75 per cent. The objects to be attained are: 1. Prevention and counteraction of shock. 2. Checking of hemorrhage. 3. To promote uterine contractions. 4. Facilitate dilatation of the cervix. 5. To expedite delivery after sufficient dilatation of the cervix. It is seldom that patients are seen with this abnormality in the early stages; in hospital cases the os is usually sufficiently dilated to admit one, two, or more fingers or to put in place a Champetier de Ribes bag. If the os will admit two fingers the membrane is ruptured at once and the bag introduced. If the membrane is not ruptured the hemorrhage is not completely arrested and there is always a further tendency to separation of the placenta, with resulting asphyxia of the child. This is caused by the bag lifting up the membranes and effecting a separation of the placenta, which when the membranes are ruptured will retract with the dilating cervix, thereby ensuring a complete compression by the bag. If the placenta prævia be of the central variety it should be perforated to reach the membranes. If there is no bleeding and the pains are strong the bag may be left alone until expelled by natural means, when the forceps may be applied and delivery effected. If the bag does not entirely control the bleeding and there is a slight oozing, traction or a weight may be applied to the bag, supplemented by a firm abdominal binder. Sinnetamby considers saline transfusions as the sheet-anchor in the treatment of placenta prævia. He says that when one gets a case in which there has been a good deal of hemorrhage, the os half-dilated, the hemorrhage stopped, and the placenta partially detached, with pulse feeble and frequent, the first impulse is to deliver at once by the traditional treatment of version. His results in this procedure have been disastrous. The sudden emptying of the uterus after severe hemorrhage produces such a severe shock as to defy all known restoratives. This fatal collapse is counteracted by the use of early saline rectal injections or transfusions under the armpit, according to the circumstances. Four pints of salines are generally given, two per rectum and two into the cellular tissues. During the seven years ending 1903 he had treated 34 cases of placenta prævia, with 7 deaths. During the three years when the above treatment had been carried out, 22 cases with no deaths have been the result. The success is ascribed to early saline transfusions, Champetier's bag, and patience.

Treatment of Postpartum Hemorrhage. The treatment of postpartum hemorrhage is discussed by Hart.[1] He includes hemorrhage in the third stage of labor in his subject, but thinks that hemorrhage with adherent placenta should receive separate consideration. In both these varieties it is necessary to separate the placenta and membranes by hand. Several anatomical conditions favor the separation of the placenta; they are: (1) a spongy or perforated space where separation may occur; (2) a special thinning of the walls of the afferent and efferent bloodvessels before they emerge from the uterine muscle; (3) a special development of muscle which grasps the vessels of the wall. The clots which form in the mouths of the thin-walled vessels when they are torn through are of great importance. The retraction ring which contains the circular vein of the uterus is the dividing line between the two major divisions of the genital tract, and drains the blood away from the portion of the uterus which is above it during the first and second stages of labor. All above it is active; all below it is passive.

The accoucheur will generally be warned by the character of the labor when hemorrhage is threatened. A long, hard labor, the use of instruments, a history of flooding in previous labors, long-continued sterility, endometritis, multiple births, placenta prævia, etc., all indicate the possibility of postpartum hemorrhage. Hemorrhage from above the retraction ring is usually due to muscular relaxation in which the vascular sinuses are not compressed. Hemorrhage from below the ring may be due to lacerations of vessels which have no enveloping network of muscular structure to grasp them. Bleeding from such a source should be accurately diagnosed first, then controlled by pressure or sutures. The conditions vary in hemorrhage from above the contraction ring.

"1. This variety occurs during the third stage of labor. The uterus is soft, blood flows from the vulva, and the placenta is within the uterus. The uterus must be squeezed and a hypodermic injection of ergotine given. Should this be ineffective the cervix must be grasped in the fingers of the right hand while the other hand grasps the fundus, and bimanual compression and anteflexion performed. This should be followed by a hot vaginal douche. Should this fail, the placenta is probably adherent and must be removed by hand. After removal the uterus must be again compressed until all danger of hemorrhage is over.

"2. This variety occurs after the third stage is over and may be treated by (*a*) abdominal compression of the uterus; (*b*) bimanual compression and manipulation; (*c*) hot vaginal and hot uterine douches. A double-current catheter should be used and the reservoir held at such a height that the water will not flow with too great force into the uterus. If these measures fail, the uterus must be plugged by packing it with iodoform gauze in three-inch strips; the packing should be done gently and may be allowed to remain twenty-four to forty-eight hours. Venous or submammary infusion of normal saline solution may be necessary in bad cases. Other measures which may be necessary are aortic compression, bandaging the limbs, and elevation of the foot of the bed.

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[1] Practitioner, October, 1904.

"3. Hemorrhage from adherent placenta and danger of sepsis. The bleeding is more profuse when only a portion of the placenta remains attached. The left hand is used to steady the uterus while the right hand is inserted to remove the obstruction. Placenta and membranes must be stripped away intact if possible. A uterine douche should be given and a tampon may also be required.

"4. Hemorrhage from adherent membranes. The hemorrhage in such cases is not so profuse if the placenta is entirely detached and the uterus will diminish in size. In these cases the hand should be inserted and the adherent membranes detached."

Inversion of the Uterus. The treatment of inversion of the uterus by the application of the Champetier de Ribes bag is discussed by Mantel.[1] The treatment is based upon the writer's results obtained in treating 5 cases of complete inversion by this method. The first case was not seen by him until fourteen months after it had occurred. It was due to traction on the cord in the third stage of labor. At the time there was copious hemorrhage, which was soon checked; persistent hemorrhage continued for fourteen months, rendering the patient very anæmic. An attempt was made to reduce the inversion under anæsthesia. Failing in this, a Champetier de Ribes bag fully inflated with air was applied. The patient died the following day. The remaining 4 cases were recent; 3 occurred during the third stage of labor and 1 a few hours after delivery, apparently due to straining at micturition. They were all treated by the same method and all recovered. Traction on the cord is the prime factor in the causation of this condition. In the case which occurred some hours after delivery Mantel believes that the inversion began during the third stage of labor and was completed by the straining of the patient. Straining in itself is not sufficient to produce the inversion, but once inversion has begun straining may complete it. The author believes that the implantation of the placenta in the fundus of the uterus is an important factor favoring inversion. These cases were all seen after their occurrence, and in the writer's opinion were all due to bad management of the third stage of labor and should not have occurred. Regarding the hemorrhage, text-books on obstetrics all mention severe hemorrhage as a natural result of this accident.

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[1] Gaz. méd. de Paris, September 10, 17, 1904; October 1, 8, 1904.

In Mantel's 5 cases it was absent in 3 and insignificant in the other 2. In the first case which had persisted so long, the hemorrhage became an important factor, but the primary hemorrhage was slight and easily controlled. The writer states that either his experience has been peculiar and unique or the text-books need revision upon this point.

Regarding puerperal infection there was in no case any serious rise in temperature, and yet the application of the bag was delayed, its earliest use being five days after delivery. It is the writer's belief that freedom from infection was due to closure of the vessels by the inversion and to the perfect and free constant drainage of the uterus.

He suggests that inversion be practised on uncontrollable postpartum hemorrhage on the one hand, and intractable infection on the other. If called to such a case the obstetrician should practice the most rigid asepsis and return the uterus to the vagina. One should not attempt to obtain immediate manual replacement of the uterus, as from Mantel's experience there is no fear of hemorrhage, and he attributes acute infection, hemorrhage, and gangrene to this practice. If the uterus will not easily remain in the vagina it should be held in place by a light gauze pack and vulvar pad. This with rigid asepsis is all that should be done in the first few days of the puerperium.

After five or six days the largest-sized Champetier de Ribes bag should be introduced and filled with air, not water. Great stress is put upon this point, as, if filled with water, the bag is incompressible and becomes too rigid and hard. When in place the bag must be disturbed as little as possible, and only removed to allow of micturition and defecation. The bladder should not be emptied too frequently, as he regards a full bladder as an aid to reposition. The bag acts mechanically and reflexly, the pains are very severe, and there is a tendency to syncope, but the condition is really more alarming than grave. As soon as reduction has been accomplished the patient is at ease. In no case was it necessary to resort to morphine or other drugs to relieve the pains. Mantel believes that in the majority of cases this accident is not one of great gravity, and barring improbable complications the inversion will be reduced in a few hours by the application of the bag filled with air,[1] on the fifth day of the puerperium.

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[1] Journal of Obstetrics and Gynecology of the British Empire, December, 1904.

THE PUERPERIUM.

Puerperal Infection. The Bacteria of the Vulva and Vagina. The abandonment of the vaginal douche in modern obstetric technique is largely the result of bacteriological studies of the vaginal secretions. The latter have not been uniform in their findings, but the tendency of recent writers is to regard the vulvar secretions as commonly infectious, and that the vaginal secretions have the power to disarm any infectious organisms that may be present. Pietz[1] found pathogenic germs in the vulvar secretion of pregnant women in 68 per cent. of the cases, in the urethra in 32 per cent., and in puerperal women the vulvar percentage was 100 and the urethral 86. He states that in pregnancy there is a great decrease in the number of bacteria in the secretions and a great increase in the puerperium. His examinations of the urethral secretions before and even after careful vulvar disinfection show the dangers of catheterization, and especially to the puerperal woman whose bladder has been reduced in resistance by the traumatism of labor.

Prevention and Treatment of Infection. Careful vulvar disinfection, the reduction to a minimum of vaginal examinations, and the wearing of rubber gloves sterilized by boiling are the recent and most enlightened means of preventing puerperal sepsis. The use of antiseptics in vaginal douches, either to prevent or to cure puerperal infection, has almost wholly passed away. The constitutional treatment of puerperal sepsis has changed but little. Supportive treatment is still the keynote. From some quarters comes the belief that very large amounts of aclohol are harmful, and that sugar, either cane or grape, being a valuable form of nourishment, may be substituted. The value of salt solution to favor elimination and to dilute toxins is more and more appreciated. Serum therapy has not made much progress and is likely to remain of little practical value until further advances have been made in the bacteriochemical investigations of infection and in the manufacture of various sera. The surgical treatment of puerperal sepsis has been fairly well restricted. Its usefulness in localized infections is certain; for generalized infection it is limited or valueless. The mortality in hospital practice is steadily being reduced; while in private practice but little if any improvement is noted.

Jardine[2] states that the problem of septic infection has been solved in the maternity hospitals. In considering the question of private obstetric work we are met with the astounding fact that deaths from puerperal fever are more frequent than they were in preantiseptic days. Milne Murray has given the following statistics regarding it:

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[1] Zentralblatt f. Gynäkologie, 1904, No. 17.

[2] Journal of Obstetrics and Gynecology of the British Empire, March, 1904.

TABLE I.—*Mortality from Puerperal Fever in England and Wales.*

1847–1856.	Early anæsthesia; no antiseptics	1.8 per 1000.
1875–1884.	Anæsthesia general; early antiseptics . .	2.28 "
1886–1895.	Anæsthesia general; antiseptics general . .	2.46 "

TABLE II.—*Childbed Mortality in Scotland.*

	Accidents in childbed.	Puerperal fever.	Total.
1897	331	205	536
1898	351	227	578

He attributes much of the increase of maternal mortality from 1847 onward to, first, the misuse of anæsthesia, and, second, to the ridiculous parody which, in many practitioners' hands, stands for the use of antiseptics. The proper use of antiseptics can do the same in the private work of physicians as it has done in the maternity hospitals. If obstetricians will conduct their cases with the same care as surgeons employ in their operations, sepsis will be rare. Mortality will be reduced and morbidity will be greatly lessened. Sepsis, while it does not always kill, may leave behind some morbid condition from which the patient will suffer, more or less, during the remainder of her life.

At the onset of labor in ordinary cases the contents of the uterus are aseptic. In the vast majority of cases pyogenic organisms are not found in the vagina; there are, however, present many bacteria which are non-pathogenic and protective. They are most efficient scavengers and have the power of destroying virulent organisms like staphylococci. The external genitals are extremely septic and special care should be observed in rendering them aseptic. The sanitary surroundings of the patient should be good; her bedding and clothing should also be clean. The external genitals should be rendered as clean as possible. The internal passages are aseptic and should not be touched, as further cleansing will do harm in removing the protective organisms. The risk commences when we make an internal examination or pass any instrument into the aseptic canal. Much can be done by external palpation, but it is impossible to entirely do away with vaginal examinations even in normal labors, and in assisted labors internal manipulations are absolutely necessary. Therefore, our manipulations should be as limited as possible and the utmost care should be used in regard to asepsis.

In making a vaginal examination the hands and arms should be as carefully sterilized as for an ordinary surgical operation. The external genitals should also be sterilized. The external genitals of the patient must be exposed to view and the labia should be separated with the fingers of the other hand. The same care and precautions should be used in operative cases and the instruments should be carefully sterilized. A certain amount of exposure is necessary, and if the physician will explain the reason no difficulty will be found in securing consent. Limit vaginal examinations and carry them out under the strictest possible aseptic precautions. Do not allow a labor to be prolonged until the woman begins to show signs of exhaustion. Twenty-four hours is usually taken as the extreme limit of a normal labor, but this in many cases is far too long. In labors lasting over twenty-four hours the mortality is four times greater than in those under twenty-four hours, while in those lasting over thirty hours it is twelve times greater.

Prolonged labor is therefore dangerous not only from the probability of the exhaustion killing the patient, but because of the greater liability of the patient to sepsis from the lowered vitality of the tissues. Therefore Jardine believes it is far better to render a little assistance early than to do the whole delivery later when nature has absolutely failed.

Conduct the third stage of labor with the utmost care and see that the uterus is completely emptied. It is all very well to say that the uterus will expel anything retained in it; and so it may, but before it has done so the probability is that septic invasion will have occurred and the whole system of the woman will have been poisoned by the absorption of ptomains or organisms to an extent which will endanger her life.

After delivery thoroughly cleanse the external parts and apply an aseptic napkin to the vulva. This part should not be delegated to an attendant unless that attendant is a thoroughly trained nurse, and even then it is better to see to it yourself. During the puerperium the napkins should be changed as often as they become soaked, and the parts cleansed with an antiseptic wash. If the attendant is not a qualified nurse she should be instructed to thoroughly cleanse her hands before she touches the patient, and insist on her using clean rags or swabs of gauze tissue. A non-poisonous antiseptic should be used for this purpose.

In ordinary cases douching should not be practised, but it should be used in cases of postpartum hemorrhage after severe operations, or where the uterine contents were septic. Douching is not necessary during the puerperium unless septic absorption has commenced. The best form of douche is a continuous one with a glass nozzle syringe which can be sterilized. Jardine usually uses a lysol (1: 100) solution for douching, although sterilized water and normal saline are good; if corrosive sublimate is used sterilized water should be used afterward to wash out the albuminate of mercury which deposits on the canal. From his large experience he has no hesitancy in stating that aseptic methods give far better results than antiseptic methods.

Antiseptic Treatment of the Puerperal Woman. A PLEA FOR FREQUENT VAGINAL DOUCHES. The antiseptic treatment of the puerperal woman which is most frequently carried out is, according to Kolipinski,[1] not enough. This treatment he outlines as follows: The protection afforded to the woman by nature is due to the acid state of the vagina, and the sterile lochial discharges which expel minute organisms or yield but a barren soil for growth. The local and general antepartum cleansing of the patient, the cleanliness of the nurse, the attention to the cleanliness of the person, hands, clothing, and instruments of the obstetrician are necessary; and, further, the injuries are to be kept germ free postpartum by a cleansing of the external genitals, by a single vaginal douching to remove blood and clots, by the use of vulvar pads or lochial guards, frequently replaced, and by an occlusive dressing.

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[1] Medical News, December 31, 1904.

Kolipinski says that these contused and lacerated varieties of wounds of the cervix, vagina, and its outlet, which, when not protected are the chief causes of puerperal infection, septic, puerperal, or childbed fever, require surgical treatment which is in its action both curative and preventive of any other pathological process. One of the best treatments in thoroughness and efficiency is irrigation, which embodies the essential act of drainage. Douching the vagina is a form of this and has been generally abandoned as both inefficient and harmful, and has increased the death rates of hospitals in a marked degree. It has grown to be feared as a maker of mischief equal almost to the intrauterine douche, or as is the curette when septic fever is active. The principal of the occlusive vulvar pad in theory and from clinical experience has not much to commend itself when the problem of treatment is the prevention of infection so prone to occur in a woman just delivered. He believes that the minute and exact details of precautions to which the physician subjects himself, the nurse, and his implements, are very much overdone and overtrusted. The mode and vehicle of contagion is the ordinary and every-day contact and exposure of a wound not protected, and not the rare and extraordinary modes of inoculation, such as from hands contaminated in the dissecting rooms or at an autopsy.

In the treatment of a wound by irrigation, where tissue is necrosed, half-dead, or of low vitality, the douche in its local or general action must not be poisonous and its quantity must be unlimited. Its action must be like the continuous flow of surgical practice. Kolipinski believes that undoubtedly the evil results from vaginal douching are due to blunders in these fundamental requisites. These blunders are: (1) the use of corrosive sublimate, of carbolic acid, or of some of its substitutes; (2) the employment of a very limited quantity. He has used antiseptic douching in normal puerperal cases and has found the effects to be in every way satisfactory, both in the feeling of general comfort to the patient and in the avoidance of septic fever or its speedy destruction. He believes in following the rule of flushing with too much rather than with too little. The method consists in washing out the vagina, vulva, and cervix (the patient being placed in the proper position), with a gallon of a solution of boric acid in tepid water of the strength of 1½ drachms to the pint. This is repeated three times a day for the first week and then discontinued altogether. Septic fever has not been found to appear in any normal case, and the antiseptic vulvar pad has been dispensed with or its use left to the discretion or wish of the nurse or patient. Boric acid he considers the most suitable antiseptic, as it has none of the objectionable effects of other therapeutic bodies of its kind, and while three douches a day are sufficient, four are not too many, and make the result all the more sure. He makes a plea that the antiseptic vaginal douche be not condemned on its past record, but be used with confidence in the way here described, after the manner of prolonged irrigation and in large quantities.

Puerperal Pyæmia. The treatment of puerperal pyæmia by the Trendelenburg method of ligating or excising the thrombosed veins, with or without an accompanying total extirpation of the uterus, is thoroughly discussed by Opitz.[1] The results of this operation have been very discouraging, only 1 case out of 10 operated upon recovered. The statistics of the Berlin clinic, where only the severe cases are admitted, show under the older methods of treatment 33 recoveries to 41 deaths. While the operation may be justified in selected cases it is next to impossible to select the case, for it is almost impossible to recognize the gravity of a case of pyæmia. The apparently mild cases may rapidly grow worse and the grave cases may recover after a prolonged illness. Pyæmia following abortion is much more fatal than that after a full-term confinement, while after criminal abortion the prognosis is even worse. The difficulty in ascertaining the facts in such cases makes this knowledge of little value in the selection of these cases for operation. An analysis of the full-term cases in the Berlin clinic show that those arising after intrauterine operations, such as manual removal of a placenta or after placenta prævia, were of much more serious import, probably from direct infection of the placental veins. The gravity of the disease was much the same whether it began early or late in the puerperium. More than half the fatal cases perished within three weeks, so that it would appear that those who could resist the disease for that length of time had a fair chance of recovery. Age is of no importance in the prognosis; a strong heart and a good capacity for assimilating nourishment are the most important factors to be considered. While the writer believes that in the future we may obtain some help from a leukocyte count, at present it is no help. Summing up it may be said that the prognosis in puerperal pyæmia neither justifies the Trendelenburg operation nor gives any information as to when it is indicated. Considering the operation from the anatomical standpoint the writer says that did one or both ovarian veins contain infected thrombi the operation would be a simple matter, but this is not often the case. The hypogastrics are frequently involved and their removal with their wide ramifications would involve a complete clearing out of the pelvis with the whole of the internal genitalia, which treatment very few pyæmic patients are in a position to withstand. The postmortem records show too general a diffusion to justify such a radical procedure. An early operation would be an unnecessary one in many cases, and even then there would be some uncertainty as to whether the infection were sufficiently localized for removal.

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[1] Deutsche med. Wochenschrift, 1904, Nos. 25, 26, and 27.

The same conditions are confronted in total extirpation of the uterus after the method of Schulte, for the first rigor means that the infection has spread to the pelvic veins and that the removal of the uterus alone would be futile. Hence other than surgical measures must be relied upon in this disease. The writer gives the method of treatment he adopted in those cases which came under his own care. Of 18 cases treated 13 recovered, 4 died, and in 1 the result was unknown. This gives a percentage of recoveries of 23. These results he attributes largely to general treatment, and especially to the administration of a lessened amount of alcohol. No remedy is known which has a direct influence upon the disease; so the treatment consists in keeping up the body strength and assisting in the elimination of poisons. Nourishment should consist of milk and eggs, with some of the easily digested proteid preparations, such as sanatogen, somatose, or plasmon. Alcohol should only be given in small quantities, preferably in the form of some light wine. Large doses of brandy or the heavy wines usually cause marked depression of the heart after the stage of stimulation is passed. Sugar, either cane or grape, is a very valuable form of easily assimilated nourishment, and may be freely given in drinks, gruels, egg-flips, etc. Its administration leads to an increased consumption of fluids which assist in the elimination of toxins by the kidneys. Salines, given by the bowel or subcutaneously, are also recommended to aid in the elimination of the toxins by the kidneys. If the patient have an offensive diarrhœa it must not be checked, as this is one of the means by which nature rids the body of the bacterial toxins. Obstinate constipation is a serious condition; the writer reports 3 of his cases having been so affected and all proved fatal. He recommends calomel for this condition.

Absolute quiet to minimize the chances of dislodging infective clots must be imposed and the patient must be kept strictly to the dorsal position. The danger of hypostatic pneumonia can partly be gotten rid of by having the patient take several deep breaths at intervals or by applying cold cloths to the chest. He considers Hofbauer's nuclein treatment, phenacetin, and antipyrin of value. The Credé silver inunction is considered valueless, but the collargol intravenous injection is more likely to prove efficient. Serum and turpentine injections are unfavorably commented upon, also all intrauterine manipulations except the removal of retained products of gestation.

Thrombosis and Embolism in the Puerperium. The following results have been observed by Richter[1] in his studies, which included 16,000 maternity cases in Leopold's clinic. Twenty cases of embolism, 78 of thrombosis, and 18 of puerperal pulmonary affections were recorded. Sixty per cent. of the cases of embolism ended fatally with the first attack; in some instances a mild attack preceded the second severe and fatal one. As a careful prophylaxis may prevent embolism it is important to be acquainted with the earliest signs or symptoms of its onset. Mahler has called attention to a rise in the maternal pulse as being the first sign of thrombosis. The writer was able to demonstrate this in 63 per cent. of his cases without any doubt; in 34 per cent. it was demonstrated with some doubt on account of the presence of fever.

In the cases of pulmonary embolism it was plainly evident in 42 per cent. of cases, while in 52 per cent. it was doubtful.

It is the writer's belief that this rise in pulse rate is more important than those symptoms which are generally accepted as characteristic—*e. g.*, rise in temperature, variable hyperæmia in the affected limb, and pain in the hip and side. This increase in pulse rate is due to the production of new collateral circulatory channels about the obstructed point in the vein. This obstruction brings about increased cardiac resistance, which the heart of the pregnant woman can only overcome by an increased number of contractions.

It is the writer's belief that thrombosis of the pelvic veins is less dangerous than that of the lower extremities. In the latter condition large thrombi are freed, which are necessarily more apt to be fatal; in the former condition smaller thrombi are freed and are caught in the capillaries and collateral vessels. When the smaller thrombi lodge in the lungs they cause sharp pains in the side, which may be followed by pleurisy, pneumonia, bronchitis, or an infarct. When thrombosis is suspected prophylaxis should consist of absolute rest in bed and careful nursing, together with the bandaging of the affected extremities.

On the Seropathy of Puerperal Fever. In an address to the Berlin Medical Society Bumm[2] said that the influence of antiseptic treatment upon puerperal fever has been less than upon any other form of traumatic infection. It is true that in hospitals, formerly its breeding places, puerperal fever is now reduced to a minimum, but in general practice, in which far more cases occur than in hospital, the influence cannot be seen. As many women die yearly now in Prussia alone from puerperal fever as in the days before antiseptics. The general mortality is less in large cities than in the country districts. The difficulty with midwives regarding disinfection lies in the impossibility of carrying out disinfection in a private house and in the necessity of their undertaking the more menial details of nursing whereby they were constantly contaminated afresh. It cannot be expected that we shall have any improvement in the prophylaxis of puerperal fever with the present system of antisepsis. Such improvement can only be attained by parturients being taken into institutions for childbirth instead of being confined at home. For the present, then, it should be our constant duty to contend against puerperal fever; and since all means of doing so hitherto at our disposal have proved insufficient; since local antisepsis is not efficient in sepsis, but only in decomposing processes; since surgical measures such as extirpation of the uterus, curetting, or according to the last French fashion, brushing out the uterus, have proved harmful, one must welcome the attempt to strike at the root of the evil by the help of seropathy. One would have thought that the past ten years might have brought some unanimity as to the value of seropathy; that this has not been the case depends upon the enormous variability of puerperal fever, the prognosis of which is so hard to estimate in individual cases. In the worst kind of general sepsis the prognosis is not doubtful; nor, on the other hand, is it so in those of local infection. Between these two forms lie the vast majority of the cases, those in which the temperature once or twice exhibits an elevation accompanied by rigors, and which, like the localized processes, generally (in 70 per cent.) recover of themselves; and if in such cases seropathy were employed that recovery would too often be attributed to the serum. One can hardly be skeptical enough in giving credit of this kind—a point to be taken to heart in regard to the serotherapy of diphtheria, scarlet fever, rheumatism, etc., also.

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[1] Archiv. f. Gynäkol., vol. lxxiv., No. 1.

[2] Münch. med. Wochen., 1904, No. 25; British Gynecological Journal, November, 1904.

The true appreciation of the action of the serum is further obscured by the differences in the quality of the sera applied. Bumm has tried them all, but the majority of his experiments were based upon Aronsohn's. In appreciating the results no comparison of statistics would be employed, for statistics were misleading. For instance, if all the cases of one-day fever were injected they would yield 100 per cent. of cure. He considers it better to divide the cases of puerperal fever into sub-classes and consider each of these independently. His divisions are as follows:

1. Peritonitis puerperalis septica: 5 cases, all treated with large doses of serum; all fatal, and none betraying any influence upon the temperature or upon the presence or abundance of streptococci in the blood.

2. Operative peritonitis following serious obstetric operations: mixed infections, 4 cases, likewise without effect.

3. True septicæmia: 3 cases; in 2, in which the blood of the cadaver was overloaded with streptococci, there was no effect; in the third the temperature was three times promptly reduced by the injection of serum, and the case recovered under the formation of a thrombophlebitis of the right leg.

4. Septic endocarditis: 3 cases, treated without effect. In one instance the serum was injected intravenously and appeared to be detrimental.

5. True pyæmia (thrombophlebitis purulenta): 3 cases were treated without effect. Intravenous injection seemed to be detrimental.

6. Parametritis and perimetritis, as localized processes which the natural forces can cure, were expressly excluded from the experiments.

7. Endometritis (the chief group); 53 cases were treated, of which a number were mild; 32 were severe. The blood was examined in 17 and streptococci were found in 12; 5 were fatal. The serum injection had no effect in 7, but in 21 the clinical aspect and temperature curve showed without doubt that it had. Bumm was therefore convinced of the favorable action of serum injections in such localized affections. He had, moreover, found additional objective evidence in the condition of the lochial secretion.

In the lochia from an infected uterus the streptococci are found in long chains *between* the pus corpuscles, but under the favorable action of the serum a change, often a critical one, takes place, and the chains become shorter and are found *inside* the leukocytes. This phagocytosis signifies that under the influence of the serum the organism has again been fitted for the task which, in cases of spontaneous recovery, it is capable of and performs. In 8 cases examined upon this point phagocytosis was established within twelve hours after the injection.

The serum as it is presented to us to-day is therefore inefficient in serious cases; yet as—except when injection is intravenous—it does no harm it should be given further trial. He has seen two abscesses occur, in each case in connection with the serum used, which was not clear and transparent. In localized processes seropathy is to be recommended unconditionally, since in a large number of cases it was beneficial; when the uterus contained streptococci and membranous exudation, serum was especially desirable, but it was of no use except in large doses.

Bumm[1] believes that an important step in advance has been taken in producing the serum by Tavel's process. In this method the serum is no longer obtained from streptococci that have passed through the bodies of animals. The prophylactic use of the serum was also recommended in cases of serious obstetric operations. As yet the serum has no bactericidal action.

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[1] Berliner. klin. Wochen., October 31, 1904.

The causes of the failure to attain results by antiseptic methods in labor cases equally as good as those obtained in other operations are reviewed by the same author. He thinks that the general treatment employed in cases of puerperal infection is insufficient and that further efforts should be made to develop a satisfactory antistreptococcus serum.

Notwithstanding its shortcomings the writer has held to the serum method of treatment for the past ten years with extremely favorable results. He has used various sera, including Marmorek's, Merck's, Tavel's, Menzer's, and Aronson's. Clinically he divides septic infection into the following classes: 1. The localized streptococcic endometritis, due to infection of puerperal wounds of the vagina and perineum. 2. Those cases due to an extension of an infection along the mucous membranes into the tubes, leading to a septic salpingo-oöphoritis and pelvic peritonitis. 3. Those due to the extension of the infection into the broad ligament, causing septic parametritis. 4. Those due to an extension of the infection over the entire peritoneum, septic puerperal peritonitis. 5. Those due to the extension of the infection from the placental site through the venous channels, leading to phlegmasia, pyæmia, endocarditis, or septicæmia.

The writer treated 53 cases, divided according to this classification, with serum injections, with a mortality of 11 per cent. He says the latter figure, however, is not conclusive, as about 80 per cent. of women with a streptococcic infection eventually get well. The value of the treatment lies in the fact that a more serious class of cases have recovered than would have been the case with other treatments. The writer admits that at present we have no serum which exerts any effect on tissues which have been invaded by streptococci beyond the point of original entrance. Where a general peritonitis, parametritis, pyæmia, or endocarditis has developed, the use of the serum is ineffectual and useless. On the other hand, when the infection remains localized in the endometrium, or where the streptococci are circulating in the blood in moderate numbers without having produced any lesions in other organs, the employment of the serum will serve to overcome the infection and its use should be recommended. The comparative harmlessness of the subcutaneous injection of the serum has led the writer to employ it as a prophylactic measure whenever the labor has been severe, the placenta adherent, requiring removal, the liquor amnii decomposed, or fever present during labor. He believes that many infections may be avoided and many rendered less violent by this measure. Aronson's sera he believes to be the best.

Bloody Milk during the Puerperium. A rare case is reported by Bouchacourt and Jannin,[1] and they have been unable to find in the literature any record of a similar one. The patient was a primipara aged twenty years. When she was delivered it was noticed that she had a chocolate-colored secretion in both breasts. This she stated had been going on for about ten days. Three days after delivery an examination was made of the secretion under the microscope. It contained blood and a large number of micro-organisms of various sorts. The staphylococcus aureus and the colon bacillus were recognized. The secretion continued of the same character until the seventh day. It was very abundant and at this time pain and swelling with some fever developed in the breasts. Pus could be squeezed from the breasts and the attack developed into a double galactophoritis. The cause of the hemorrhage could not be discovered.

The Morbidity of the Puerperal State in Cases Complicated by the Birth of a Macerated Fetus. A compilation and study of the statistics of this condition has been made by Kothen.[2] He has collected 358 cases of labor which were complicated by the death and maceration of the fetus. In a series of 34 of the cases there was some complication during the puerperal period, and a morbidity of about 10 per cent. was observed. Another series consisting of 274 cases showed 157 normal recoveries. In these cases which recovered there was considerable decomposition of the fetus; the morbidity was considered to be due to outside infection during the conduct of the labor rather than to the death of the fetus. Klein made an extract from the tissues and organs of a fetus which died about fourteen days before birth and injected it into animals. Two died from the results of the injection. The symptoms exhibited by these animals were those of toxæmia. The material was proven by culture to be free from bacteria.

In Kothen's own cases, which were reported from the clinic at Giessen, fever was considered present when the temperature rose above 99.5° at any time. In 14 of these cases, or 20 per cent., there was fever. In 27.1 per cent. there was some abnormality following the delivery of a macerated fetus. In no instance was the death of the mother traceable to a macerated and dead fetus. The writer's conclusion was that the complication of a dead and macerated fetus gives an additional morbidity of 10 or 11 per cent. to that of the ordinary morbidity of labor and the puerperal state.

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[1] Bull. de la Soc. d'obstet. de Paris, June 16, 1904; Journal of Obstetrics and Gynecology of the British Empire, January, 1905.

[2] Archiv f. Gynäkol., Band lxx., Heft 3, 1903.

Stypticin for the Bleeding of Subinvolution. H. J. Boldt[1] has used this drug (cotarnine hydrochlorate) for various forms of uterine bleeding, and refers to its use in postpuerperal bleeding after careful removal of the placental or decidual remnants. In no instance of slight bleeding during pregnancy in which it was administered did uterine contractions follow, and the bleeding usually ceased. The average dose is 2½ grains every two to three hours. I have used this drug for cases of prolongation or early recurrence of the bloody lochia in cases where no foreign material remained in the uterus, and with few exceptions it has been most efficient. I have found the following combination of especial value:

℞—Ergotin	gr. j.
Extract hydrastis	gr. v.
Cotarnine hydrochlorate	gr. iiss.

This, the amount of one dose, is given in two capsules three or four times daily.

The Bladder and its Disorders during the Puerperal Period. An interesting paper on this subject has been contributed by Ruge.[2] Formerly writers have generally ascribed bladder disturbances after labor to overdistention; some have attributed it to abdominal pressure and have bestowed undue importance upon the theory. Ruge has been led to believe through his investigations that the mechanism of all cases of labor taking place through the vagina causes strong pressure to be brought to bear upon the bladder at the neck and at the trigonum, thereby causing lesions which produce characteristic results. The longer the labor, the greater the pressure and the greater the danger of injury to the bladder. The proportion in size between the fetal head and pelvis, the time that the head is in the pelvis, and especially the period that the head remains upon the pelvic floor are important factors. The production of the characteristic lesion known as bullous œdema is attributed to the anatomical formation of the bladder. Cystoscopic examination reveals areas of darkened, swollen mucous membrane, which persist for from four to six weeks after labor. Hemorrhages may also be discovered in the bladder in the area from the sphincter to the posterior wall. The hemorrhage lies beneath the epithelium and is found spread out in various-shaped areas. During recovery there is a gradual change in color back to the normal.

The writer finds that these lesions of the bladder are not confined to those cases delivered by forceps or other difficult obstetric operations. They were found in cases where pelvic contraction was absent. In cases where the injuries were slight, no symptoms were present; where the injuries were severe, there was retention of urine or painful micturition. Changes in the urine were noted and were dependent upon the changes in the mucous membrane of the bladder. Special care is urged in using the catheter in these cases on account of the great liability to transfer infection to the raw surfaces. Injuries of a similar character to those described in the bladder were found in the ureters and urethra.

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[1] New York and Philadelphia Medical Journal, February 25, 1905

[2] Monats. f. Geburts. u. Gynäkol., 1904, Band xx.

Gastrointestinal Hemorrhages of the Newborn. False melæna may be due to bleeding from the mother's nipples during nursing, swallowing of blood during labor, excoriations from the child's mouth caused by breech extractions, and operative division of a frænum for tongue tie. These conditions must be recognized and distinguished from true melæna, says Lop.[1] True melæna is most often due to syphilis, and even in the absence of a family history or of physical evidences of that disease it should be treated as such. The resulting anæmia is always a serious condition if death does not occur at once, and the prognosis should be very guarded. The immediate treatment consists of hot applications, cutaneous friction, the incubator, boiled water by the mouth in liberal quantities instead of milk, and rectal injections of normal saline solution night and morning, to which a little brandy has been added. Ergot and chloride of iron may be given, but the author prefers calcium chloride in doses of ½ to 2 grams a day. Along with this an active antisyphilitic treatment should also be instituted.

OBSTETRIC SURGERY.

Artificial Dilatation of the Cervix in Obstetrics. Among the pre-eminently practical advances in surgical obstetrics none within the past few years has occasioned greater discussion and difference of opinion than the indications for, and the relative value of, the method of opening the cervix of the pregnant womb in order to terminate pregnancy or labor. For that reason this subject will be discussed at length. I[2] consider skilful, relatively rapid dilatation of the cervix an assured means of preventing many disastrous complications, although there are those who condemn it as meddlesome and dangerous, and liable to be followed by serious results.

To appreciate the problem of obstetric dilatation of the cervix, and to estimate the practical value of any method employed for that purpose, we should study nature's method of dilatation. The longitudinal fibres of the uterus exert a direct pull upward of the lower segment, and assisted by the downward push of the hydrostatic pressure of the

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[1] Presse médicale, September 21, 1904; American Journal of Obstetrics, March, 1905.

[2] American Medicine, May 20, 1905.

bag of waters, and later of the presenting part of the fetus, the lower segment is dilated, the internal os is opened and drawn upward, and the cervix is thus attenuated and effaced, the dilatation being the final stage of the process.

Thus the value of any method of artificial dilatation, gradual or rapid, should be measured by its power to evoke uterine contractions and thus assist the upward pull which promotes effacement of the internal os. The methods for either slow or rapid dilatation of the cervix and emptying of the uterus which are employed are as follows: 1. The flexible bougie. 2. The hydrostatic bag. 3. The bougie and bag, with preliminary partial mechanical dilatation. 4. Manual dilatation (the methods of Harris, of Bonnaire, and Edgar). 5. Branched steel dilators (Bossi's and its various modifications). 6. Dührssen's vaginal Cæsarean section.

Dilatation when Rapid Delivery is Unnecessary. My experience with flexible bougies has taught me that, while efficient in promoting contractions and softening the cervix, their action is often slow and tedious. The hydrostatic bag also evokes contractions and hastens physiological dilatation, but it alone will sometimes fail to irritate the uterus. Hence I have been induced in the last few years to combine all three methods, and all the cases indicating the relatively slow induction of labor have been invariably treated by this combined method with most satisfactory results. After a soap-and-water toilet of the vulva, vaginal entrance, perineum, and anal region, followed by a mercuric bichloride douche (1: 2000) of the external genitals, the cervix is caught in a double tenaculum; the canal, if required, is digitally or instrumentally dilated to the size of the index finger; an instrument combining a branched dilator and bag introducer is inserted into the cervix, taking care not to rupture the membranes. The entire length of the cervix is dilated to from 5 to 7 cm., the degree sufficient to admit the bag and indicated on the instrument. The index finger passed between the expanded blades, notes the degree of tension at the internal os, and can be used to assist the dilatation, acting as a third blade alternately stretching the anterior and posterior margins of the os internum. A hollow bougie (Delamotte, No. 23) containing a stylet, having the curve of a prostatic catheter, sterilized by boiling, is now inserted, the stylet being gradually withdrawn from that portion of the bougie which is entering the uterus. By this manœuvre the tip of the bougie is made to hug the anterior uterine wall, thus avoiding puncturing the amniotic sac, and the bougie from the internal os outward, being kept rigid by the stylet, ensures an upward and onward course of the tip of the bougie toward the fundus. It also prevents the coiling of the bougie at the internal os, which otherwise often occurs and prevents the prompt institution of uterine contractions. When the bougie has been introduced at least ten inches into the uterus, a bag of the Voorhees pattern, but having a capacity (600 c.c.) three times as great as the largest size for sale in the shops, is rolled into the smallest possible roll, caught in the instrument previously used as a dilator, but now used as a convenient forceps for placing the bag, and is gently carried into the dilated cervix; the forceps is opened and removed and the bag is distended with 480 c.c. of sterile water by means of a metal syringe whose piston rod is graduated in cubic centimetres. This bag incompletely filled adapts its upper segment to the shape and position of the presenting part without tending to displace the latter, and upon the occurrence of a uterine contraction the lower segment of the bag is gradually distended in the cervix to the size of the largest Voorhees bag. After the bougie and bag have been introduced, the vagina is packed through a bivalve speculum with gauze. The operation takes about twenty minutes and is ordinarily done without an anæsthetic. For a very nervous and apprehensive patient a few whiffs of ethyl chloride or chloroform may be used during the dilatation of the cervix. This large and incompletely filled bag more nearly resembles in function the natural bag of waters than any artificial aid we can employ.

When dilatation is inordinately slow, continuous, or intermittent traction should be made on the stem of the bag. This traction, to be most efficacious and least dangerous, should be made with recurring pains, since during the pains the cervix is drawn upward by the action of the uterus and effacement of the cervix is then materially assisted by the bag. Continuous traction by a tape and weight has some danger of tearing the lower segment of the uterus, but may be avoided by releasing the weight at intervals of half an hour, and never using a weight exceeding three pounds. When the bag distended by 480 c.c. of water can be drawn through the external os by firm and steady traction, the cervix will be dilated to 9 cm., and the termination of labor may be left to nature, or when rapid delivery is indicated forceps or version may immediately follow. After the bag has been removed, especially if the membranes have ruptured, an examination should always be made to note the occurrence of prolapse of the cord or of fetal extremities, accidents that rarely follow but require immediate replacement, reinserting the bag if necessary to retain the prolapsed cord in the uterus. Another important use of the bag is to hasten a slow first stage of labor, before or after the rupture of the membranes; this is especially true of occipito-posterior positions arrested at the brim of the pelvis by incomplete flexion. In many such cases I have shortened the patient's suffering and have saved infants' lives by preventing prolonged labor and inevitable asphyxia. It is also valuable as a tampon for the cervix in lateral and marginal placenta prævia, and after replacing a prolapsed cord it has proved a convenient means to keep the cord within the uterus during the stage of dilatation. The average time required for the completion of labor by means of the bougie and bag alone in 35 cases of induced labor for the lesser degrees of pelvic contraction in my practice, including the cases of spontaneous delivery, as well as those terminated by forceps or version, was twenty-nine and one-half hours. For other complications, such as toxæmia of pregnancy; grave cardiac, kidney, and pulmonary diseases; pernicious nausea and vomiting, chorea, prolongation of pregnancy, etc., I find that in 52 such cases of induced labor the average time required for the completion of labor was thirty-four hours. In this group of cases there is of course a larger proportion of labors terminated spontaneously.

Since I have used the method in which the introduction of the bougie and bag has been preceded by partial instrumental dilatation of the cervix, the average duration of labor in 18 cases terminated by forceps or version has been seven and one-half hours; in cases of spontaneous delivery, sixteen and one-half hours. These latter figures contrasted with the bougie-bag method show a diminution of twelve and one-half hours in the duration of spontaneous labors and of five and one-half hours in labors terminated by version or forceps. Measured then by the standard of relatively quick delivery, by its physiological effacement and dilatation of the cervix and by the absence of lacerations associated with rapid and complete mechanical or manual methods, the method I have described has been most satisfactory. For cases not requiring *accouchement forcé*, an operation whose indications become less frequent, the wider my obstetric experience grows the method I have described reinforces what past experience has taught us is a safe method by adding thereto partial mechanical dilatation to a degree that is free from the danger of lacerations, and which diminishes the uncertainty and delay of the method of the bougie and bag.

In late years there has been a growing tendency to depart from the slower methods of terminating pregnancy and the first stage of labor. The indications for rapid surgical interference have widened until it would appear that there is danger of the slower and safer methods being laid aside. Of the rapid methods of opening the cervix, the ones now most discussed and most likely to find a permanent place are rapid dilatation by one of the metal dilators and Dührssen's vaginal hysterotomy. For my own part I am convinced that these methods will find a place of assured value, but that their proper indication and employment will always require most discriminating obstetric judgment. Eclampsia and placenta prævia are without doubt the most frequent affections now subjected to one or the other of these operations. That cases do occur demanding delivery in from five to thirty minutes is beyond question, but they are certainly rare, and the injudicious application of Bossi's dilator or Dührssen's operation to many or all cases of convulsions or of hemorrhage due to placenta prævia can only cast discredit upon obstetric surgery.

My experience with more than 100 cases of *eclampsia* has taught me that the most rapid delivery is by no means a *sine qua non* of successful treatment. With eliminative treatment well under way, and showing no effect upon repeated and violent convulsions in a patient whose toxæmia has apparently not produced the gravest structural changes in the kidneys, but has overwhelmed the nerve centres, in such a case, with an undilated and rigid cervix, I believe the proper obstetric treatment is to choose between Bossi's and Dührssen's methods. In this choice the character of the cervix to be dealt with, more than its degree of dilatation, and the state of the patient, are the most important factors. Thus, when the cervix is tough, elongated, and uneffaced, or scarred with dense cicatrices, Bossi's dilator is a dangerous instrument even in the hands of an experienced operator, for no matter how trained is his "mechanical sense," extensive lacerations do occur in such cases without warning, even with a finger in the cervix to note and estimate the danger line of tension, and shock and hemorrhage are instantly added to the burden under which the patient is sinking. To one who hopes to attain the skill necessary to use the Bossi dilator with success, Dührssen's vaginal section will be equally well acquired. It is quicker, accompanied by no greater shock, traction by an assistant upon the cut edges of the incision controls hemorrhage, and the most difficult part of the operation, the introduction of stitches, is not difficult with assistants, a good light, large vaginal retractors, and vaginal incisions if required.

On the contrary, when we find the cervix partially effaced, softened, yielding, and therefore dilatable, Bossi's dilator has distinct advantages, and especially under the environment of obstetric practice outside of hospitals. Too rapid dilatation with this instrument under any circumstances is hazardous, never less than thirty minutes being devoted to a dilatation of 11 cm. The dilatation should be advanced with greater slowness and caution after passing the 8 cm. mark, for the lacerations are most likely to occur toward the end of dilatation, when the tissues are thinned to their utmost. A grave defect in Bossi's instrument, namely, its liability to gouge and lacerate the posterior wall of the cervix, has been overcome theoretically in the modification devised by de Seigneux; the blades of this instrument have practically a pelvic curve and vary in size, affording a broader surface in contact with the dilating cervical structures. Drawing the cervix down with a tenaculum and thus sharply anteflexing it, so often necessary to introduce the Bossi instrument, can be dispensed with in using De Seigneux's. From the standpoint of quick delivery after dilatation, the dilator is inferior to Dührssen's vaginal section, because version after the former is likely to find the cervix somewhat recontracted after removal of the instrument, and the passage of the after-coming head may produce lacerations wholly beyond one's control. The more rapid the dilatation the greater is this tendency to contraction. After Dührssen's section the upper angle of the incisions may be guarded by suture before turning the child. Whenever possible, therefore, forceps delivery is to be preferred to version after using the Bossi dilator, because the degree of tension can be more readily observed and sufficient time may be taken in the delivery of the head through the cervix to prevent such lacerations that is out of the question in a head-last delivery. The more recent methods of Bossi and Dührssen discount the methods of rapid manual dilatation of Harris, Edgar, and Bonnaire.

As I have stated, my experience is against forcible delivery in the vast majority of eclamptic cases. Reviewing these three methods of delivery as they may be related to the treatment of *placenta prævia,* it is my conviction that Bossi's instrument and Dührssen's hysterotomy have even a more restricted field than in eclampsia. The degree of hemorrhage, the variety of placenta prævia, and the state of the cervix largely determine the treatment. Moderate hemorrhage is usually associated with lateral implantation, and when the placenta invades a small area of the lower uterine segment, bag dilatation, followed by a forceps delivery, if necessary, is efficient. The large bag inside the ruptured amnion and traction sufficient to control bleeding should be used until the cervix is opened enough to apply forceps. More extensive invasion of the dilating segment of the uterus by the placenta and more profuse hemorrhage may be successfully treated by partial metallic dilatation, the large bag followed later by version with slow extraction to avoid laceration and serious hemorrhage after delivery. Central or marginal implantation, with rigid cervix, profuse hemorrhage, and a mature and living child—a combination of conditions I have yet to observe—is the only class of cases for which *accouchement forcé* should be considered. With such a case I should perform Dührssen's hysterotomy, for I believe it meets the indications more rationally than any plan of treatment heretofore proposed. Rapid separation of the bladder, incision of the cervix and the anterior uterine wall with scissors to the limit of the separation, pushing aside, or perforating if necessary, the obstructing portion of the placenta, and a rapid version and extraction of infant and placenta, followed at once by a firm tamponade from fundus to vagina, temporarily clamping the bases of the broad ligaments if the hemorrhage is profuse, and then diminishing the volume of the tampon for the proper introduction of sutures, appeal to my surgical and obstetric judgment.

Conclusions. 1. The necessity for the induction of a premature labor by a method requiring less than twelve hours is extremely rare.

2. The method most frequently employed, and most satisfactory in my experience, has been a combination of partial mechanical dilatation, followed immediately by the insertion of a bougie and an extraordinarily large Voorhees bag incompletely filled.

3. For the relatively rare cases in pregnancy or labor requiring *accouchement forcé,* the choice of rapid mechanical dilatation depends especially upon the character of the cervix, the general state of the patient, and the firm determination not to attempt too rapid dilatation. Bossi's or De Seigneux's instrument is cleaner, less tiresome, applicable to the same class of cases, and is not more dangerous than manual forcible dilatation.

4. Dührssen's vaginal section is a most valuable operation in the hands of an expert obstetric surgeon, and should be preferred to too rapid metallic dilatation, except when conditions favorable to the latter are unmistakably present.

5. For the treatment of the gravest form of placenta prævia and of accidental hemorrhage, Dührssen's hysterotomy in the hands of an expert vaginal operator should prove the best method of treatment ever offered.

Rapid Mechanical Dilatation of the Cervix in Obstetrics. A critical review of the means and methods employed in this operation is submitted by Fothergill.[1] There has always been a prejudice against the use of instruments for this purpose, and very little has been written about the earlier attempts to introduce them. The human hand was the first approved means of mechanical dilatation; this was followed by the introduction of elastic and non-elastic hydrostatic dilators. The mechanical dilator obtained but little notice until about 1890, when Bossi described his three-pronged instrument. It met with only moderate success until 1901, when Leopold saw the inventor operate with his improved four-pronged model. Leopold used the instrument and endorsed the claims made for it: 1. That it can be used even when the cervix is closed and as yet unshortened. 2. That the operator is sure of obtaining sufficient dilatation to allow of the delivery of a living child. 3. That this can be secured, if necessary, in from fifteen to twenty minutes. 4. That the use of the instrument excites uterine action, even in the cases of uterine inertia. 5. That dilatation up to 11 cm. can be secured without unduly distending the vagina.

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[1] Journal of Obstetrics and Gynecology of the British Empire, October, 1904.

Lederer and Keller were favorably impressed with the instrument in their clinics, but Keller regarded it as an instrument to be used only by those practitioners specially experienced in obstetric work, as it might be dangerous in the hands of a beginner. Its special value he considered was in the treatment of eclampsia. Dührssen declared emphatically that it was not to be regarded as an advance in operative midwifery; he said that (1) the instrument did not always enable the operator to secure enough dilatation for the delivery of a living child, (2) that the operator was not able to control the process, and (3) that the method was positively dangerous, some of the tears produced being followed by bleeding and some becoming infected. Dührssen thought that the favorable results obtained by Leopold and others could have been obtained by hydrostatic dilators or by multiple incisions of the cervix, while the less favorable cases could have been treated better by incisions or by vaginal Cæsarean section. Bossi replied vigorously by stigmatizing Dührssen as illogical and unscientific in criticising a method he had never tried. He stated that in his own work at least there had been no difficulty in securing adequate dilatation; that by keeping a finger upon the cervix control of the operation had always been satisfactory; that tearing and hemorrhage had been very rare, and that infection was more easily prevented with this than other methods. Bossi had found that incisions of the cervix as recommended by Dührssen, besides causing hemorrhage, were often extended by tearing during the extraction of the fetus, and that such tears often involved the body of the uterus and were alone sufficient to bring about fatal results. The use of cervical incisions could only be justified so long as there was no other method which answered the following demands: (*a*) certain and sufficient dilatation to allow of the delivery of a living child; (*b*) rapidity in securing this degree of dilatation—ten minutes and upward; (*c*) power of exciting uterine action accompanying dilatation. Bossi's method fulfilled all these requirements, and he declared that cervical incisions and, even more so, vaginal Cæsarean section remained merely as historical remembrances; the time for their use was past and gone.

Von Bardeleben, after using the dilators in ten cases, reported that the value of the metallic dilator as a stimulant to uterine action is very small; much inferior to the non-elastic bags of Champetier de Ribes and others; hence they are, in any case, either unnecessary or undesirable. When a cervix can be dilated, the means most closely resembling the natural process, the inelastic bags, should be used; when it cannot be dilated, it should be cut as advised by Dührssen rather than torn open by Bossi's dilator.

On the contrary, many reliable authorities continue to find metallic dilators of the Bossi type useful and apparently harmless when carefully used in suitable cases. De Seigneux has recently produced a modification of the Bossi type in that his instrument is constructed with a true pelvic curve; it is less heavy and complicated, and the dilating surface of the blades is larger. He says that the plane in which the points of the blades move must be parallel with the plane of the inlet of the true pelvis if the blades are to act evenly and truly upon the cervix, whose axis is approximately perpendicular to the plane of the brim. In instruments of the Bossi type it is impossible to bring the prongs into the real pelvic axis, and to this cause, says De Seigneux, the bulk of the tears which occur are due.

In using the dilators an anæsthetic should be used. The instrument should be inserted into the cervix without the aid of a speculum or vulsellum. Any difficulty encountered in instruments of the Bossi type is due to a lack of a true pelvic curve. De Seigneux claims that his type does away with all these, as with the risk of boring and digging injuries of the cervical wall. The dilatation should be as gradual as is compatible with the safety of the mother and child.

Dilatation should be slower and slower as it progresses, as tearing becomes more and more likely as the process nears completion. A frequent if not constant examination of the cervix should take place by a palpating finger passed between two prongs. The average of the time recorded as occupied in dilating the cervix seems to be growing longer as experience is accumulated. Dilatation should be carried farther than the degree absolutely necessary because the rapidly dilated cervix contracts very quickly. The more rapid the dilatation the more rapid is the subsequent contraction. One should preferably deliver by forceps rather than by turning.

The rupture of the bag of waters during the dilatation is a common and unavoidable occurrence. Trouble is sometimes experienced when the presenting part is driven between the prongs, as the instrument cannot be withdrawn unclosed without injury to the mother, and it cannot be closed without injury to the child. De Seigneux's instrument avoids this complication, for, after removing the handle, the blades can be removed one by one.

Before using any instrument the markings on the scale should be verified by comparing them directly with the space as measured by a tape between the prongs. It is recommended by some writers that the prongs be covered with pieces of rubber drainage tubes to afford additional security to the cervix. Leopold gives the following indications for the use of the metal dilators: 1. Induction of premature labor and acceleration of labor induced by other means. 2. *Accouchement forcé* including eclampsia, heart disease, phthisis, and other disease, putrefying fetus, threatened death of the fetus, placenta prævia, anatomical stenosis of the cervix, cicatricial stenosis of the cervix. 3. Retained placenta with contracted cervix. The writer does not consider it likely that this instrument will ever be much used for inducing labor as opposed to accelerating labor induced by other means. In placenta prævia there is a pronounced difference of opinion as to its use, with apparently the decision against it. In anatomical and cicatricial stenosis of the cervix the metal dilators are seen at their worst. When the metal dilators are admissible in any case, the state of the cervix and the state of the patient, rather than the nature of the case which makes their use desirable, are the points to consider.

The operator will only have to choose between dilatation and multiple incision in those cases in which rapidity is the main object. The state of the patient is first to be considered. If delivery within a few minutes is demanded by the interest of the mother or child, the next point to consider is the state of the cervix. The state of the tissues is the guide here rather than the size of the os. If the operator judges the cervix to be softened enough to admit of complete dilatation within a few minutes, he will dilate, otherwise incise. Neither fingers nor bags will compete with metallic dilators when extreme rapidity is required. It is perfectly easy to tear the cervix and infect the uterus either with the fingers or with bags. Considering that on account of the perishable nature of "rubber goods" very few practitioners keep hydrostatic dilators in a state ready for use, and that dilating with the fingers is a most painful and tiring process for the operator, and that fingers are not so easily sterilizable as metal, it would appear that in the fairly common cases in which some assistance in the first stage of labor would be desirable, could it be given safely and easily, there will be a field for the use of the metal dilators.

The Relative Value of the Means and Methods Employed in Accouchement Force. There is still a wide difference of opinion existing among authors and teachers regarding the relative value of the various methods employed to empty the pregnant uterus by force at any time from the fifth to the ninth month of gestation. Zinke[1] considers this a sufficient reason for discussing the subject again. There are two distinct classes of *accouchement forcé*: (*a*) the rapid and (*b*) the slow method of delivery. The rapid class represents those cases in which the condition of the mother, and sometimes that of the child, demands a prompt and rapid termination of the pregnancy. The other class comprises those cases which may be delivered slowly because of the absence of immediate danger to the mother and the existence of a justifiable disregard of the life of the fetus. The time consumed in the first class varies from a few minutes to an hour; in the scond class the time consumed may be twelve, twenty-four, or more hours. The methods discussed are: 1. The graduated steel or vulcanite dilators and the branched or bladed dilators. 2. The bag or hydrostatic dilators. 3. The manual dilatation of Harris and the bimanual dilatation of Bonnaire and Edgar. 4. The superficial and deep cervical incisions and Dührssen's vaginal Cæsarean section. 5. The conservative Cæsarean section. 6. Bossi's and similar metal dilators.

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[1] American Journal of Obstetrics, November, 1904.

The graduated steel dilators of division 1 are only used to partially open an unobliterated cervix or rigid os preparatory to digital, manual, or bag dilatation. The bag or hydrostatic dilators are regarded by many obstetric authorities as the best, safest, and most natural method of hystereurysis for *accouchement forcé*. The writer considers it by no means applicable in all cases, nor devoid of danger. Bag dilatation he considers is indicated mainly when the mother's condition is good or nearly so, when time is not an important element as to the safety of either the mother or child, and when uterine hemorrhage proceeds from a lateral or marginal placenta prævia rather than from a central implantation. In the latter form the child's life is at once sacrificed and the mother's life is seldom saved when bag dilatation is the method of forced delivery. In eclampsia it is doubtful whether the use of the bag is advantageous, unless it be to hasten a labor already begun. Hystereurysis has a tendency to increase the number and duration of the eclamptic attacks.

The use of the bag is the best means of dilatation in premature rupture of membranes, uterine atony, malpositions of the fetus, either before or immediately after rupture of the amniotic sac, when dilatation of the os is slow and irregular, in prolapsus of the cord, prolapsus of the feet, and especially in the lateral and marginal varieties of placenta prævia. Some of the objections urged against bag dilatation are that thinning and attenuation of the cervix do not take place when it is used; if traction is added the cervix is drawn down and not up as in natural labor. Prolonged or undue traction upon the bag endangers the rupturing of the lower uterine segment and the danger of sepsis can never be entirely excluded. Lacerations may occur in introducing it and displacements of the fetal parts with immediate prolapse on removing it have occurred. Contraindications to bag dilatation are: 1. When the head occupies the pelvic cavity. 2. When sepsis is present in the vagina. 3. Placenta prævia centralis. 4. When the cervix is hard, uneffaced, and the canal closed. There are strong objections to the Harris and Edgar-Bonnaire methods of dilatation. Shock, lacerations, hemorrhage, and sepsis are not infrequent complications even in cases well suited to this method. Neither method should be adopted unless the cervix is completely or nearly effaced, and the os patulous and readily dilatable. While manual and bimanual dilatation are justifiable procedures under circumstances favorable to their execution, it is pertinent to remark that the life of the child, as a rule, and that of the mother, occasionally, is sacrificed under these two methods.

The Superficial and Deep Cervical Incisions and Dührssen's Vaginal Cæsarean Section. Dührssen's operation is indicated when the cervix is hard and intact; when there is marked elongation of the portia vaginalis; when the cervix is the site of extensive and unyielding cicatrices or of malignant disease. Cervical incisions are recommended in *conglutinatio orificii externii*, in premature rupture of the membranes, generally contracted pelves, eclampsia, heart disease, articulo mortis, threatened rupture of the uterus, placenta previæ, ablatio placentæ, etc. The dangers of sepsis, hemorrhage, and laceration are urged against these operations, but they are not well taken, as the same is true of any of the methods resorted to in *accouchement forcé*. The conservative Cæsarean section for *accouchement forcé*, as yet, is challenged by a large proportion of obstetricians and general practitioners. The writer believes that "if after due reflection and consideration it is impossible to save both mother and child, save the mother." The life of many an unfortunate mother has been lost by not disregarding the interest of the child about to be born. Many cases can be cited where the death of pregnant women was due to persistent, vain, and fruitless, though heroic and sanctioned, efforts to deliver them of their offspring, dead or alive, per *vias naturales*. The argument against this operation that obstetricians and general practitioners are more familiar with the use of the tampon, bag, manual, and metal dilatation, with version, forceps, and embryotomy than with the technique of Cæsarean section, and that it should not be tried until they have failed with any, several, or all of the methods of forced labor, is as unsafe as it is unwise. Cæsarean section for *accouchement forcé* should never be employed unless the child has attained at least the seventh calendar month of gestation and manifests signs of vigor and life. This in the presence of placenta prævia, ablatio placenta, or eclampsia associated with a hard-closed cervix, and perhaps a malpresentation of the child and primiparity would constitute an almost definite indication for this operation.

The Bossi dilator and its competitors are intended for the purpose of displacing deep cervical incisions, and vaginal as well as abdominal hysterotomy. The following metal dilators are considered of value: Bossi's, Frommer's, Kayser's, Krull's, Raineri's, Preiss's, Schwarzenbach's, Müller's, and Knapp's modification of Bossi's dilator. Bossi gives the following indications for the use of his dilator:

1. The cervix may be immediately dilated, whatever the condition

of softening, shortening, or dilatation, to a sufficient extent to extract a fully developed fetus. 2. This dilator should be preferred to Cæsarean section, antemortem as well as postmortem. 3. It is indicated in the induction of premature labor. 4. In grave cases of eclampsia. 5. In cases of heart disease, tuberculosis, dead and putrid fetus. Fieux adds pneumonia, pleurisy, and ascites. 6. When the life of the fetus depends upon rapid extraction. 7. In placenta prævia, anatomical cervical stenosis with undue prolongation of labor. 8. In cicatrical stenosis the instrument should be tried before cervical incisions are made. 9. In cases of incarcerated placenta, the result of uterine tetany. The above indications are supported by Bossi and several other able men since he made his first report. Dührssen prefers the easily performed vaginal Cæsarean section bearing his name. Hartz believes that all such instruments should be relegated to the lumber-room of obstetric instruments. De Lee, Bacon, von Bardeleben, and Ohlshausen believe it a dangerous instrument and not to be recommended. Zinke believes that rapid and complete metal dilatation will never become a popular method and that sooner or later it will be universally condemned.

The Modified Champetier de Ribes Balloon. Further results in the use of the modified Champetier de Ribes bag are presented by Voorhees.[1] In explanation of the great increase of operative deliveries in the last few years, especially in the large cities, the writer cites the fact that women nowadays are marrying later. With increasing years the cervix and perineum grow more rigid, the uterine contractions become weaker, and in pregnancy the joints are firmer and become less succulent. The older the woman the larger the child, the harder the bones of its skull, the smaller the fontanelles, and the less separated the sutures. In the second place, the city-bred woman—the hot-house patient—cannot and will not endure pain, and too often after a few hours of labor she simply gives up and the accoucheur has to do the whole thing. To the writer's notion, in a certain class of these cases, there is no measure of more value for starting labor and shortening its duration, thereby relieving much suffering, than the Champetier de Ribes balloon. The bags employed by the writer differ very little from those of Champetier. They are slightly different in size and made stronger in order to withstand the abdominal and uterne contractions, to resist the tension when filled with a fluid, and to permit a certain amount of traction on the tube without rupture. To insert the balloon an anæsthetic is employed only in those cases where a preliminary divulsion or a manual dilatation of the cervix is necessary to get enough room for the insertion of the bag, where the cervix is situated so high that it is very difficult to reach, when the patient is very nervous and excitable, or where the vulvar orifice is very narrow and sensitive. A light chloroform narcosis is all that is required, as the time required in the vast majority of cases is only a few minutes. No special introducing forceps or syringe is necessary. It is well to insert the largest-size bag possible at the outset and to remember, in filling the bag with the fluid, to inflate slowly with light traction on the tube so that the head, if presenting, will be displaced as little as possiqle. The patient is left to nature's efforts unless there is need of haste, when traction is made at regular intervals upon the tube. Successive bags are inserted in cases where great haste is necessary and where pains are few and far between or stop altogether after the first bag is expelled.

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[1] American Journal of Obstetrics, January, 1905.

Voorhees has previously reported a series of 72 cases out of 2113 deliveries at the Sloane Maternity Hospital. The cases were those in which other methods had been tried and failed. The bags were of advantage in all cases and the field of usefulness of the balloons was more definitely determined.

This second series is reported to emphasize the utility of the bags and the great dependence we place upon them, especially in private practice. The first set were cases occurring in the author's private practice. Here he used it in 39 out of 200 cases. The second set comprise four years' deliveries at the Sloane Maternity Hospital, comprising 4272 cases.

The objections urged against the use of the bags are: 1. That they may rupture the membranes. This rarely happens and makes little difference if they do. The fetus suffers some, but little, as the waters cannot all drain away. If the fluid does escape the dilatation is rapid enough to do little harm. 2. That they may separate the placenta (only in placenta prævia). But the bag either arrests the hemorrhage on being filled or when traction is made on the tube. 3. That they may increase the tension in the interior of the uterus. It is not great and no harm is ever done. It is not painful to the patient and never ruptures or weakens the uterus. 4. That they may displace the presenting part. This is possible, but by slow distention of the bag and by watching the presenting part during the distention we can keep it in place. This accident occurred occasionally in the series reported, but was easily corrected. It is more apt to occur in cases of flat pelves. 5. That the cord may prolapse. For this to occur the cord must be long or loosely coiled about the neck. This accident has happened a few times, but, as far as Voorhees was able to learn, was not responsible in any of these cases for the baby's death. It occurred once in the first series and was detected too late to save the child. A rule should be made to examine when the bag is expelled to find whether the cord has prolapsed. If it has occurred the proper management should be instituted at once. 6. Sepsis. The balloons can be boiled, and if the aseptic technique is correct there should be no infection. Although there were a few cases of sepsis reported in this series the author cannot believe that they were due to the use of the balloon.

A *résumé* of the first series is given by Voorhees and also a very careful and exhaustive study of the later and larger series. His conclusions are: 1. That the modified Champetier de Ribes bag is the best artificial hydrostatic dilator of the cervix, because it is most like nature's bag. 2. That the bags are especially effective in dry labors to start pains. 3. Labor, if prolonged and protracted from whatever cause, is hastened and in a large percentage of the cases terminates spontaneously after their use. 4. That the bag has proven to be the best and most reliable method of inducing labor for all indications. 5. In eclampsia and placenta prævia the bag has a field of usefulness which diminishes markedly maternal and fetal mortality.

The Sloane series comprised 4272 cases (September 1, 1899, to September 1, 1903). There were 626 cases of dry labors; bags were employed in 48 of these. The protracted labors numbered 238 cases; bags being employed in 50 of the cases and manual dilatation in 19 cases. Induction of labor was resorted to in 147 cases, bags were employed in 111, a bougie alone in 6, tampon of cervix alone in 1, scarification of vulva in 1, and *accouchement forcé* in 28. The total number of bag cases numbered 209, while the total number of manual dilatation cases was 73.

Eclampsia. There were 65 cases: 14 postpartum, 2 spontaneous deliveries. In 6, bags alone were used; in 11, bags were followed by version or forceps, and 31 were delivered by an *accouchement forcé.* Seven of the mothers died—a mortality of 11 per cent. The causes of death were as follows: pulmonary embolus, 1; ruptured uterus, 2; purulent peritonitis, 1; hemorrhage, hepatitis, and toxæmia, 3. Of the children 32 died—a mortality of 49 per cent. Including all cases, 19 of the children were non-viable, giving a true mortality of 29 per cent.

Placenta prævia was met with in 61 cases; 7 were delivered normally; in 1 case the membranes ruptured; 4 were delivered by breech extraction, 3 by forceps, 19 by version; in 10, bags were used, and 17 were delivered by *accouchement forcé.* Of the cases of placenta prævia 4 mothers died—a mortality of 6 per cent. Death was caused in 3 from rupture of the uterus, and in 1 from hemorrhage (moribund on admission). Of the children 23 died, giving a mortality of 35 per cent.; as 4 were non-viable, the real mortality was 29 per cent.

In the private series there were 200 cases, and of these 47 were dry labors, bags being employed in 4. The protracted labors numbered 19 cases, bags being used in 4. Induction of labor was employed in 32 cases, the bag being used in 29 and a bougie alone in 3. Placenta prævia occurred in 3 cases; bags were employed in 2 and *accouchement forcé* in 1. The total number of cases in which the bag was employed was 39. The total number of manual dilatations was 15. There were 3 cases of *accouchement forcé*, 1 of eclampsia, 1 of placenta prævia, 1 of protracted labor. Manual dilatation was used lightly in 11 cases.

Induction of Premature Labor. The operation of inducing labor, in those cases of contracted pelves in which it has been found by careful measurements that the woman will be unable to give birth to a child of average size and weight at full term, is coming more in favor since we have learned the good results attained by the more recent method evolved in performing the operation and in the subsequent care of the child. Herman[1] in discussing this subject, says that in those cases of contracted pelves in which a child of average size cannot be born and in which it can only be born at full term on condition that it is a small one, the alternative lies between the repeated performance of premature delivery and Cæsarean section. Cæsarean section can be combined with the sterilization of the patient, or if that be not done the patient can be advised that the risk will be somewhat less in subsequent sections, because the uterus after Cæsarean section often becomes adherent to the anterior abdominal wall, thus doing away with some of the dangers. The reduction of the risks in this operation is one of the most remarkable accomplishments in the progress of surgery, and it is an operation which should have a very low mortality. In doing a Cæsarean section one deals with healthy parts; you can tell beforehand where everything is situated, and it is the simplest and easiest operation in operative surgery. In cases in which the repeated induction of premature labor would be necessary, Cæsarean section is the best alternative to offer.

There will always be cases in circumstances unfavorable to the successful performance of Cæsarean section, in which, therefore, it will be safer to induce the labor before the child has grown so large as to cause difficulty and danger in delivery. Since the introduction of antiseptics there is no greater risk to the mother in induced premature labor than in labor at full term. The great objection to the induction of premature labor is that the child is born puny and small, and for that reason requires greater attention to rear it than a child born at full term. In rearing a child born prematurely the main indication is to keep it warm. A child born before full term has not the power of producing all the heat it requires. It is not sufficient to wrap it up warmly or to prevent the heat of its body escaping too readily, but additional heat must be applied to it from without. The earlier the pregnancy is terminated, the more need has the child for an artificial supply of heat. Therefore in these cases an incubator should be provided, for a child can be thus prevented from losing heat as well as having it supplied from without. If a child survive the first few weeks it will usually thrive.

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[1] Clinical Journal, May 11, 1904.

THE ULTIMATE RESULTS OF INDUCED LABOR FOR MINOR DEGREES OF PELVIC CONTRACTION. I believe the excellent results obtained by operators for both mother and child in the elective Cæsarean section for minor degrees of pelvic deformity[1] have induced many unnecessary operations for this condition. I am in accord with the teaching which condemns the induction of premature labor on account of the high fetal mortality, with a true conjugate of 7.5 cm. or less in generally contracted pelves, and 7 cm. in the flat pelvis. For conjugates between 10 and 8 cm., however, I believe that the skilful induction of labor at the latest permissible period of pregnancy continues to have its legitimate place. The statistics which have induced some operators to try Cæsarean section all come from foreign clinics. Kleinwächter is cited as stating that following induced labor for pelvic deformity only 78.3 per cent. of the children are born alive, that many die shortly after birth, and only 60.4 per cent. leave the hospital in good condition. Figures like these have caused many operators, especially in this country, to abandon the induction of labor for *any* degree of pelvic narrowing.

Two important factors to be considered in such a poor showing are the termination of the pregnancy at too early a date and a lack of continued care in bringing up prematurely born infants. Statistics of a large number of cases studied by Kronig and Zweifel show that in 504 cases of labor in flattened pelves those with conjugates between 9.5 and 7 cm. required intervention for the contraction alone in less than 9 per cent. of the cases; with conjugates between 8.5 and 7 cm. in 16 per cent. for primiparæ and a larger percentage for multiparæ; with conjugates between 9.5 and 8.5 cm. in 2.7 per cent. In 222 cases of generally contracted pelves with conjugates 10 to 7.5 cm. assistance was required in 9 per cent.; with conjugates 8.5 to 7.5 cm. assistance was needed in 16 per cent., and with conjugates from 9.5 to 8.5 cm. no assistance was required.

In these 726 cases 91 per cent. of the labors were considered normal —*i. e.*, they were like a series of the same number of labors in normal pelves. In 44 of these cases the children were stillborn. Of the 64 cases requiring assistance because of the pelvic contraction, 25 children were saved and 39 were lost—a total loss of 83. I believe that many, if not all, of those children passing through the conjugates below 8 cm. could have been saved by Cæsarean section, and that almost all of those passing through conjugates above 8 cm. could have been saved by the induction of premature labor. I therefore wish to emphasize the usefulness of inducing labor in the *lesser* degrees of contraction *in order to give nature the little assistance she may need to save the children that without this aid are frequently lost after version or a difficult forceps operation at term.* When a patient is first seen too late to induce labor at the most suitable time, I never allow her to go to or beyond full term, but terminate pregnancy at once and deliver as may seem best after the test of labor. The interruption of pregnancy must not take place too early and thus risk losing the child from prematurity, or too late, necessitating a difficult operative delivery, thereby increasing the mortality, even of children not excessively premature. To avoid these errors requires experience, study, and a keen "mechanical sense." The four factors to be determined are: 1. The size of the pelvis. 2. The individual's expulsive energy of the uterus. 3. The determination of the exact duration of pregnancy or its equivalent, the degree of prematurity of the child at the time selected for terminating the pregnancy. 4. The relative size of the child's head. The size of the pelvis can be accurately ascertained. The expulsive energy of the uterus can be estimated, in multiparæ, from the history of previous labors; in primiparæ it must be left to the test of actual labor.

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[1] American Journal of Obstetrics, September, 1904.

The determination of the exact duration of pregnancy is difficult. When the cessation of menstruation and the date of quickening are known, or, better still, the probable date of conception, the duration of pregnancy can be fairly accurately predicted. The possibility of conception having occurred in the premenstrual and not in the usual post-menstrual days can be a source of error of two or three weeks; and when this factor is in doubt, if the remaining factor will permit it—*i. e.*, the relative size of the child's head—the date selected for inducing labor should err on the side of deferring that date from ten days to two weeks.

For determining the relative size of the head to the pelvis I believe that the method of Mueller, by which he manually engages the head in the pelvis by suprapubic pressure and studies the relation of the head to the symphysis, by abdominal and vaginal examination, depends for its accuracy upon individual skill and experience, and to be the most reliable of all methods. In reaching my conclusions I have placed most reliance upon suprapubic pressure of the head and a reliable history of the menstrual period. An operative delivery, version or forceps, after the induction of premature labor, adds a distinct risk to the child, and when possible should be avoided. After true labor pains have begun and the cervix has dilated, it is a positive advantage to place the patient in the combined Trendelenburg-Walcher posture. This posture has at times avoided the necessity for interference, and when version or forceps has been required they may be performed with greater ease and safety to the infant.

When the conjugate is between 8 and 8.5 cm. the operation is deferred until the thirty-sixth week; if the conjugate is above 8.5 cm. and a careful estimate of the relative size of the head to the pelvis will permit it, pregnancy is allowed to continue beyond that date.

The method I use to induce labor is as follows: A hollow linen bougie containing a stylet having the curve of a prostatic catheter is passed through the cervix and gradually onward into the uterus. As the bougie enters the uterus the stylet is gradually withdrawn; this procedure renders that part of the bougie within the vagina stiff and unyielding and that part within the uterus flexible; the point of the bougie is thereby directed upward and toward the uterine wall and does not injure the amniotic sac, and prevents the coiling of the bougie within the uterus. Traction on the cervix with a double tenaculum is necessary in most cases. The largest-sized Voorhees bag is immediately introduced after the bougie has been placed; a few whiffs of chloroform may sometimes be required in nervous women to do this. If pains are slow in developing and it is desired to produce a prompt onset of labor the vagina is distended with Braun's kolpeurynter and intermittent traction practised upon its stem. When a Voorhees bag can with gentle traction be drawn through the cervix, an instrumental delivery or version and extraction can be immediately performed if indicated.

An analysis of 30 cases shows neither maternal mortality nor morbidity; 23 infants are living, 7 died. Two were stillborn, 1 a monstrosity and 1 from impaction of the chin after version; 2 died from prematurity, 1 from infection of the navel, 1 from intraperitoneal hemorrhage, and 1 from aspiration pneumonia.

Hebotomy (Extramedian Symphysiotomy). Van der Velde[1] reports several later cases which he has delivered by the operation of hebotomy, in which the division of the os pubis is made with a saw and by which a permanent expansion of a narrow pelvis is obtained. The first case was a primipara, very small, aged thirty years. Vertex presentation, pelvis flat, rachitic, with a circumference of 75 cm. and a diagonal conjugate 9.5 cm. The membranes were ruptured, labor having begun twenty-four hours previously. The head was fixed in the pelvis, the presentation was L. O. A., and pains were very strong. After waiting three hours the head was still impacted and it was decided to do hebotomy.

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[1] Zentralblatt für Gynäkology, 1904, No 30; Annals of Gynecology and Pediatry, October, 1904.

Chloroform was used as an anæsthetic. Immediately upon separation of the bone the sawed surfaces separated 3 to 4 cm. There was very little bleeding, the wound was separated from the birth canal, and the fascia was uninjured.

The head was pressed through the brim by Hofmeier's manipulation, when the divided ends of the bones separated 5 cm. The pelvis was then pressed together and further delivery accomplished by forceps. The muscles of the pelvic floor and the narrow vulvovaginal ring opposed so strong resistance that a deep incision was necessary to the right, obliquely and downward. The child was born alive. The biparietal diameter of the child's head was 10¼ cm., the bitemporal 9 cm. The edges of the wound were brought together and about a finger's breadth of space was left between the sawed ends of the bones. The patient was able to walk in three weeks, and upon examination later it was found that a firm callus had united the severed bones immovably. After union her pelvis, which had formerly been symmetrical, was asymmetrical. The distance from the right anterior superior spine to the symphysis was 17 cm., on the left 19 cm. In May, 1904, when the patient was again pregnant, no callus could be felt and there was nothing to show that an operation had been performed except the asymmetry and enlargement of the pelvis. The second case was one of twin pregnancy. The pelvis was flat, rachitic, and the diagonal conjugate measured 9¼ cm. The patient was placed in the gynecological position and chloroform given. An incision was made two fingers' breadth to the right of the median line, beginning at the upper border of the pubic bone and running downward and inward through the outer side of the labium majus to below the border of the pubic bone. The index finger of the left hand was then passed to the edge of the pubic bone and used as a guide to pass a needle around the os pubis. When the point appeared on the opposite side a Giglio saw was attached to it and it was withdrawn. The bone was easily sawed through; about forty ounces of blood was lost during the operation. The saw was then withdrawn, a compress placed over the wound, and the first child easily delivered; the second child followed immediately and the placenta was expressed. Postpartum hemorrhage was so free that the uterus had to be packed with gauze. The wound was then closed with sutures and the patient placed in bed with her pelvis supported on each side by sand-bags. There was some slight œdema of the labium afterward. A callus was formed by the eighth day, and on the tenth day the patient was able to move her legs. As a result of the operation the distance from the right anterior superior spine to the os pubis was increased 1.5 cm.

The writer considers hebotomy a much preferable operation to symphysiotomy, as afterward there is a permanent enlargement of the pelvis. After symphysiotomy the enlargement may only be temporary, and again we find that the cut ends of the symphysis at times fail to unite properly, causing a difficulty or inability in walking.

Among others who approve of and practice this operation is Doederlein.[1] He reports four additional cases which terminated successfully as regards both mother and child. He advises waiting before sawing the bone entirely through to determine whether or not it is possible for the fetal head to pass through the pelvis. A child whose head was not disproportionately large might pass through without the section of the pelvis. He also recommends the application of a sterile rubber tube around the pelvis to prevent the excessive spreading of the pelvic bones during the extraction of the child's head.

The operation of hebotomy, originated by Stoltz, has never had a wide popularity, and some operators, after having performed it a few times, have abandoned it as having no advantages and being more formidable than symphysiotomy. The present very limited field of usefulness of the latter operation indicates that hebotomy is an operation not likely to be widely employed, since its claims for superiority over symphysiotomy—diminished dangers and permanent enlargement of the pelvis—have not been completely established.

Cæsarean Section for Myasthenia Gravis. It is a very rare occurrence in the course of myasthenia gravis complicating pregnancy that one would resort to Cæsarean section. Such a case, however, was reported by Gemmell.[2] The clinical feature of the disease is weakness of some or all of the voluntary muscles, sometimes amounting to a paralysis. After a prolonged rest with appropriate treatment the affected muscles may again respond to the will, although they again become rapidly exhausted. Stimulation by the faradic current leads to a similar exhaustion. The muscles most frequently affected are those most commonly used, and the facial paresis and ophthalmoplegia give the patient a characteristic appearance. Sensory symptoms are absent and death terminates the disease in a large proportion of cases. No pathological structural changes have so far been found. Gemmell's patient was admitted to the Lying-in Hospital five days before labor was expected. Her condition was one of pitiful weakness and exhaustion, and during the first twenty-four hours she had four attacks of dyspnœa, and sleep was almost absent for the first forty-eight hours. The extreme gravity of the case had been noted and it was realized that death might occur during an attack of dyspnœa. The effect of the advent of labor was feared, and it was felt that if she did not succumb in the first stage attempts at the use of the secondary powers in the next would almost certainly bring on a fatal attack of dyspnœa.

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[1] Zentralblatt für Gynäkology, 1904, No. 42.

[2] Journal of Obstetrics and Gynecology of the British Empire, December, 1904.

It was determined to await the onset of labor and act accordingly. However, two days after admission the dyspnœa became urgent and the cyanosis marked. The following morning the respiratory movements were only those associated with hiccough, and the extreme gravity of the condition led to the decision to perform Cæsarean section as being the procedure which would most speedily terminate the pregnancy in a manner which could be most under control. The operation was rapidly carried out without difficulty, chloroform being used as an anæsthetic, and very little required. Uninterrupted recovery followed, accompanied by gradual improvement in the respiratory and myasthenic symptoms. A small piece of uterine muscle removed at the operation was examined for pathological changes, but with negative results. If such a case had been met with in the earlier stages of gestation the writer believes it would have been proper treatment to cut short the pregnancy.

Rupture of the Uterus Twice in Six Years. This noteworthy accident reported by E. Patz[1] occurred in a woman aged twenty-nine years. She was delivered of her first child with forceps at the age of twenty-two. Four years afterward a living child was born spontaneously, twelve months later an abortion took place, and her fourth pregnancy came to term and labor began August 4, 1898. Labor proceeded normally until the head appeared in the vulva, when it was decided to apply forceps. As the first blade was being placed in position the head suddenly disappeared. Five hours later when she was admitted to the hospital she was apparently moribund. She was covered with clammy perspiration, her lips were blue, cheeks sunken, and pulse scarcely perceptible. While fetal parts could be felt distinctly through the abdominal wall, no trace could be felt per vaginam. Rupture of the uterus had taken place and though it was considered scarcely probable that she would recover, laparotomy was performed. A dead child weighing about four and a half pounds was extracted, and much blood and clots escaped with it. There was a vertical laceration which involved the vagina from its attachment to the bladder and the entire length of the cervix uteri. All bleeding was stopped and an iodoform drainage was placed in the cervical tear and conducted out through the vagina. The laceration was then closed with silk, and the abdominal wound closed by suturing in layers. She was given a litre of normal salt solution subcutaneously and rallied well. At the end of four weeks she was discharged cured. The cause of the rupture was discovered to be disproportion between the size of the fetal head and the pelvis. The pelvis was of the generally contracted rickety type. She was a short woman with bilateral genu valgum and a waddling gait. She was warned that abortion should be performed if she again became pregnant, but July 13, 1902, she was again admitted in labor at full term. The os was fully dilated, the membranes had ruptured, and the head was engaged in the pelvis. Delivery by forceps was tried, but proved ineffectual and a craniotomy was performed. Her puerperium was normal and she was discharged six days later and again warned as to letting herself go to term. October 9, 1903, she was again admitted in labor. The os was not fully dilated, the head was engaged in the pelvis, and the membranes unruptured. The writer hoped to deliver by craniotomy when the os was fully dilated. Four hours after her admission the pains had entirely ceased and the fetal head had disappeared. The fetal form could be felt beneath the thin abdominal wall, but not per vaginam. One-half hour later she was anæsthetized and the abdomen opened at the site of the former wound. A quantity of blood escaped and a dead child weighing about seven and three-quarter pounds was delivered with the placenta. The laceration involved the posterior aspect of the vagina and cervix in an oblique direction from left to right and from below upward. The old cicatrix was sound. To prevent further pregnancies a hysterectomy was done. A rubber tube was tightly wound around the cervix and adnexa at the level of the middle of the laceration, two long needles being inserted for additional security, and everything above the ligature was removed. A large drainage tube was then inserted into that part of the laceration below the rubber tube and conducted out of the vulva. The laceration was closed with sutures except for a small opening for the drainage tube immediately below the ligature. This was difficult on account of the friable nature of the injured vaginal wall. The abdominal wound was closed with interrupted sutures from the umbilicus to the uterine stump, which was fixed on either side to the wound with a continuous suture just below the level of the drainage opening. Convalescence was apyretic, the wound healed rapidly, and she was discharged five weeks after the operation. The frequency of rupture of the uterus, according to Bandl, is once in every 1180 labors; according to Franque, once in every 3225 labors. Those cases in which the child escapes into the abdominal cavity are even rarer. The prognosis is bad; the child usually dies immediately and the mother perishes from hemorrhage or shock. Should she survive these dangers she is subject to the dangers of a general peritoneal infection. The maternal mortality in the preantiseptic days was variously estimated at between 89 and 95 per cent. Treatment then was either expectant or directed to vaginal delivery at all costs. Since the introduction of asepsis laparotomy has been performed frequently. It is remarkable that one patient should have survived two such operations.

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[1] Wien. med. Wochen., August, 1904; Medical Review, October, 1904.

Spontaneous Rupture of Uterus during Pregnancy through the Cicatrix of a Cæsarean Section Wound. The following case was reported by Kerr.[1] The patient, a IV-para, had been admitted to the hospital for the purpose of having a Cæsarean section done for the second time. Two years previously she had been delivered by Cæsarean section by the author. Her previous labors had been very difficult and both times the children were extracted with difficulty and were dead. Her pelvis was of the flat rachitic type, the diagonal conjugate being three and three-fourths inches. She fell into labor twelve hours after admission, and was allowed to go on until the os was fully dilated, as it was intended to deliver her by symphysiotomy. When this stage was reached it was found that there was too great a disproportion between the relative sizes of the head and the pelvis to allow of it, and the Cæsarean section was chosen. The fundal incision of Fritsch was employed. The incision came upon the placenta, which was removed before extracting the child. The child was extracted and the uterine wound stitched with little trouble or bleeding. The wound healed by first intention and she left the hospital after making a perfect recovery. Upon her admission for the second operation she was, as near as could be judged, in her thirty-seventh week of pregnancy. Since the beginning of the pregnancy her health had been good and she had suffered no special discomfort. The abdomen was irregularly enlarged, the bulk of the swelling being to the right side. After an enema given at midnight the patient complained of slight pain in the epigastrium, which extended upward and to the right. She slept from 12.30 to 5 A.M., when a sanguineous discharge was noticed coming from the vagina, and at the same time she complained of a slight pain in the right iliac region. At 7 A.M. her temperature was 97.6° and the pulse 80, and the pain, which had now spread over the abdomen and was not very great, was thought to be due to painful uterine contractions. There was no nausea or vomiting. At that time her condition was not considered serious, but the abdominal tenderness suggested the thought that the old uterine cicatrix had given way. As the pulse was 84, regular, and of good volume, the house surgeon was directed to look into the case carefully. One hour later the abdominal tenderness was more marked, the pulse 90, the temperature subnormal, and the breathing more rapid. She lay with her feet slightly drawn up and there was exquisite abdominal tenderness, more marked to the right and below the umbilicus; the pain also extended up to the right shoulder.

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[1] Journal of Obstetrics and Gynecology of the British Empire, November, 1904.

On palpation the fetal parts could be readily defined; there was a dull note in the flanks when percussed. One-twentieth grain of strychnine was given and the patient prepared for operation. She was anæsthetized and the abdomen was opened along the cicatrix of the previous incision. A large quantity of dark-colored blood immediately escaped and the intact membranes and placenta with the enclosed fetus presented. The uterus lay retracted, behind and down toward the pelvis. A full-term dead child was extracted from the membranes. The uterus was then examined and found to have a transverse rupture extending over the fundus of the uterus, evidently through the cicatrix of the former incision. There were two slight adhesions, one to the omentum and one to the abdominal wall. A supravaginal hysterectomy was done and the patient made a good recovery. Several features are worth particular attention. The slight alteration of pulse tension and rate and the absence of collapse; one is usually apt to consider complete collapse an essential feature of this condition. The writer then considers the following questions which arise in connection with the case: 1. Did the fact that the incision was a fundal one predispose to rupture? 2. Was there anything in the uterine wound at the previous Cæsarean section which favored the rupture? 3. Is the danger of rupture of the cicatrix such that one should condemn non-sterilization? As regards the first of these questions he believes that a fundal cicatrix is more liable to give way than an ordinary longitudinal incision, because the latter is strengthened by the adhesions to the abdominal wall which usually form after this incision. He would never employ the fundal incision were he to leave the uterus behind. In another case in which he operated for the second time the old fundal cicatrix was found thinner than the rest of the uterine wall. Meyer[1] also reports a case of rupture through a fundal cicatrix. Regarding the second question, it was stated that the fundal incision encountered the placenta, and therefore in closing the wound the placental site had to be stitched. It is quite conceivable that union may not be so firm under such circumstances. The placenta in the second instance was also planted over the fundus and the old cicatrix, and that doubtless also favored rupture. Meyer's case was just the same, the placenta was implanted over the old cicatrix. There was no suspicion of sepsis in Kerr's case; catgut was employed for suturing and the methods of Sänger and Cameron for insertion of the sutures were employed. Any cicatrix is liable to give way; there is therefore a distinct danger in not sterilizing the patient and preventing her becoming pregnant again. The question obstetricians will have to settle is whether or not this danger is so great that repeated section should be condemned.

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[1] Zentralblatt für Gynäkology, 1903, p. 1406.

The practice at present is not to sterilize the patient at the first operation; this has become so on account of the good results obtained in repeated sections. Targett, Galabin, Horrocks, Koblanck, Guillaume, Woyer, and Everke have reported cases of rupture in which the anterior incision was used the first time. Williams' statistics of first sections done by Chrobak, Schauta, Leopold, Braun, Ohlshausen, Zweifel, Reynolds, Bar, Charles, and Chagrin, in a total of 335 operations, show a gross mortality of 6.8 per cent. The writer's mortality in 30 cases was 6.6 per cent. The statistics of Wallace on repeated Cæsarean sections shows a mortality even lower than the above figures. Kerr's question then, "Is the danger of rupture of the cicatrix such that one should condemn non-sterilization?" it will be noted, is answered in the negative.

Intrapelvic Hæmatoma following Labor. A rare and very interesting case is that reported by Williams.[1] The patient was aged thirty-three years and had been married three years. When first seen in consultation she had been delivered three hours previously of her first child, which weighed under six pounds. The labor was slow and was terminated by an easy, low forceps operation without anæsthesia. The placenta was shortly afterward expelled and her condition seemed to be most satisfactory. Almost immediately after delivery the patient began to complain of intense pain of a tearing character about the rectum; this was so severe that an opiate was required. The pain became more severe and the patient gradually passed into a state of collapse. Three hours after delivery her pulse was between 160 and 170; she was greatly shocked and complained of intense pain. The subcutaneous injection of salt solution and the administration of strychnine and whiskey improved her condition temporarily, but it soon changed for the worse. On palpating the lower abdomen a large, round, fluctuating tumor about the size of a man's head was found. It extended up to the umbilicus and was surmounted by a hard, rounded body, about the size of two closed fists, which was clearly the uterus. A vaginal examination revealed the posterior and left vaginal fornices bulging markedly, and through them a wave of fluctuation could be transmitted to the abdominal tumor. The cervix was not torn and was displaced upward and backward; the external os lay to the right of and just in front of the sacral promontory. A diagnosis of internal hemorrhage was made; it was supposed to be due to incomplete rupture of the uterus with escape of blood between the layers of the broad ligament. Immediate operation was advised and begun after some little delay. The patient at that time was practically pulseless, though the heart could be distinctly heard on auscultation. In making the abdominal incision after cutting through the fascia the components of the abdominal wall could not be distinguished and a loose, blood-stained tissue came into view. The fingers instead of reaching the peritoneum passed directly into a large cavity filled with clotted blood, situated between the symphysis pubis and the anterior and inferior wall of the bladder, and extending between the folds of the broad ligament to the left wall of the pelvis. Under the impression that he was dealing with a ruptured uterus, the incision was extended upward and disclosed a normal uterus except for its unusual position. The finger of an assistant passed through the cervix established without any doubt that there was no communication between the uterine canal and the cavity described. The peritoneum above the hæmatoma was then closed to prevent any contamination of the abdominal cavity, and the hæmatoma rapidly drained. The bleeding point was found to be an oozing surface upon the anterior and inferior surface of the bladder in which there were no large vessels involved. The cavity was then tightly packed with iodoform gauze, the vagina also being packed to afford counter pressure. A piece of iodoform gauze was left in the abdominal wound. The packing was left in place for three days before being replaced; the wound rapidly closed. This condition following labor is extremely rare, as only about 20 cases are recorded in literature, and to the best of the writer's knowledge this is the only case of the kind in which an operation was done. The probable cause of the hemorrhage was a tearing of the antevesical plexus of veins during the forceps operation, though it was not necessarily the cause of it, as several cases have followed normal and spontaneous delivery. A differential diagnosis between rupture of the uterus and this condition is practically a matter of comparative indifference, as in either event operative measures are required if the hæmatoma increases in size and the patient's condition becomes at all serious.

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[1] Johns Hopkins Hospital Bulletin, No. 158

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A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES, AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES.

EDITED BY

HOBART AMORY HARE, M.D.,

PROFESSOR OF THERAPEUTICS AND MATERIA MEDICA IN THE JEFFERSON MEDICAL COLLEGE OF PHILADELPHIA; PHYSICIAN TO THE JEFFERSON MEDICAL COLLEGE HOSPITAL; ONE TIME CLINICAL PROFESSOR OF DISEASES OF CHILDREN IN THE UNIVERSITY OF PENNSYLVANIA; MEMBER OF THE ASSOCIATION OF AMERICAN PHYSICIANS, ETC.

ASSISTED BY

H. R. M. LANDIS, M.D.,

VISITING PHYSICIAN TO THE TUBERCULOSIS DEPARTMENT OF THE PHILADELPHIA HOSPITAL, TO THE WHITE HAVEN SANATORIUM AND TO THE PHIPPS INSTITUTE; DEMONSTRATOR OF CLINICAL MEDICINE IN THE JEFFERSON MEDICAL COLLEGE.

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LIST OF CONTRIBUTORS.

WILLIAM T. BELFIELD, M.D.,

Associate Professor of Surgery in the Rush Medical College; Professor of Genito-urinary and Venereal Diseases in the Chicago Polyclinic, Chicago.

JOSEPH C. BLOODGOOD, M.D.,

Associate in Surgery, Johns Hopkins University, Baltimore, Md.

JOHN ROSE BRADFORD, M.D., F.R.C.P., F.R.S.,

Professor of Medicine and Physician to the University College Hospital, London.

JOHN G. CLARK, M.D.,

Professor of Gynecology in the University of Pennsylvania, Philadelphia.

WILLIAM B. COLEY, M.D.,

Attending Surgeon to the General Memorial Hospital; Associate Surgeon to the Hospital for Ruptured and Crippled; Clinical Lecturer in Surgery and Instructor in Surgery at the College of Physicians and Surgeons, Columbia University, New York.

FLOYD M. CRANDALL, M.D.,

Adjunct Professor of Pediatrics, New York Polyclinic Hospital; Visiting Physician to the Minturn Hospital for Scarlet Fever and Diphtheria; Consulting Physician to the Infants' and Children's Hospitals, New York.

WILLIAM EWART, M.D., F.R.C.P.,

Physician to and Joint Lecturer on Medicine at St. George's Hospital, and Physician to the Belgrave Hospital for Children, London.

EDWARD MILTON FOOTE, M.D.,

Instructor in Surgery, Columbia University; Visiting Surgeon, New York City Hospital.

CHARLES H. FRAZIER, M.D.,

Professor of Clinical Surgery in the University of Pennsylvania; Surgeon to the University, Howard, and Philadelphia Hospitals.

WILLIAM S. GOTTHEIL, M.D.,

Professor of Dermatology and Syphilology, New York School of Clinical Medicine; Consulting Dermatologist to the Sheltering Guardian Orphan Asylum; Dermatologist to the Lebanon and Beth Israel Hospital, and to the German West Side Dispensary, New York.

CHARLES PREVOST GRAYSON, A.M., M.D.,

Lecturer on Laryngology and Rhinology in the Medical Department of the University of Pennsylvania; Physician-in-Charge of the Department for Diseases of the Throat and Nose in the Hospital of the University of Pennsylvania ; Laryngologist and Otologist to the Philadelphia Hospital.

EDWARD JACKSON, M.D.,

Emeritus Professor of Ophthalmology in the Philadelphia Polyclinic.

H. R. M. LANDIS, M.D.,

Visiting Physician to the Tuberculosis Department of the Philadelphia Hospital, to the White Haven Sanatorium and to the Phipps Institute ; Demonstrator of Clinical Medicine in the Jefferson Medical College.

RICHARD C. NORRIS, M.D.,

Assistant Professor of Obstetrics in the Medical Department of the University of Pennsylvania, Philadelphia; Physician-in-Charge of Preston Retreat.

ROBERT B. PREBLE, A.B., M.D.,

Professor of Medicine in Northwestern University Medical School; Attending Physician to Cook County, St. Luke's, Wesley, German, and Polyclinic Hospitals, etc., Chicago.

ROBERT L. RANDOLPH, M.D.,

Associate Professor of Ophthalmology and Otology in Johns Hopkins University, and Associate Ophthalmic and Aural Surgeon to Johns Hopkins Hospital, Baltimore, Md.

WILLIAM G. SPILLER, M.D.,

Professor of Neuropathology and Associate Professor of Neurology in the University of Pennsylvania ; Clinical Professor of Nervous Diseases in the Woman's Medical College of Pennsylvania and in the Philadelphia Polyclinic.

J. DUTTON STEELE, M.D.,

Associate in Medicine, University of Pennsylvania.

ALFRED STENGEL, M.D.,

Professor of Clinical Medicine in the University of Pennsylvania, Philadelphia.

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PROGRESSIVE MEDICINE.

DECEMBER, 1905.

DISEASES OF THE DIGESTIVE TRACT AND ALLIED ORGANS, THE LIVER, PANCREAS, AND PERITONEUM.

By J. DUTTON STEELE, M.D.

THE SALIVARY GLANDS.

Parotitis as a Complication of Gastric Ulcer. This condition has had but little notice taken of it until quite recently. While quite uncommon, it is a disagreeable and serious complication of rectal feeding in gastric ulcer, and as it can be avoided by care of the mouth and proper diet it is desirable that more attention be given to it in the standard works on medicine. Soltau Fenwick and Rhodes[1] found parotitis in 2 per cent. of 153 cases of gastric ulcer admitted to the London Temperance Hospital.

Howard found 1 case of parotitis in 82 cases of ulcer from the Johns Hopkins Hospital records—1.2 per cent.

Paget reported 2 cases and Hone[2] collected 8 from literature and added 1 of his own.

Fenwick remarks that the occurrence of parotitis must be infinitely less common than his figures indicate, since no cases of ulcer are admitted to his wards unless they have had hæmatemesis or symptoms of perforation, conditions that greatly favor the development of inflammation of the parotid gland. In his experience the parotitis occurred only in cases of hemorrhage and curiously always upon the fourth day after the first vomiting of blood. All 3 of his patients were on rectal feeding at the time. The fever was atypical and the highest temperature came several days before there were signs of pus. All the cases suppurated and the development of the pus was very insidious. In one instance several free incisions were made without finding pus, although a day or so later the abscess broke into the external auditory canal. The pulse was a better indication of the onset of suppuration than the temperature. The mode of infection was evidently through Steno's duct, since it occurred only in cases in which the mouth had been neglected and was very foul. All of the cases were upon rectal feeding exclusively, and Fenwick suggests that it might be well to always allow milk and water by the mouth, with a view of preventing dryness of the oral mucous membrane, which must favor infection. The decubitus of the patient had apparently much to do in determining which gland was affected, as the dependent one was always the first attacked, and then, when the patient was forced by the pain to lie upon the other side, that parotid was affected in turn unless great care was taken. The symptoms are those of acute parotitis, namely, pain, swelling, and inability to open the mouth. In one case facial paralysis developed, which did not subside until convalescence was established.

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[1] Medical Press and Circular, December 7, 1904, vol. lxxviii.

[2] Australasian Medical Gazette, February 18, 1898.

The treatment is strict cleanliness of the mouth by frequent washing. Antiseptic mouth washes are suggested by Fenwick and Rhodes, such as a moderately strong solution of Condy's solution, listerine 2 per cent., resorcin 10 per cent., or sulphurous acid. It may be well to stimulate the flow of saliva by asking the patient to chew a rubber ring. As parotitis is most apt to occur after hemorrhage, it is in such cases that special care should be given to the condition of the mouth. I have always found that a 1:4 solution of hydrogen peroxide is a very efficient mouth wash in such cases, and in avoiding dryness of the mouth in cases requiring rectal feeding a spray of liquid albolene or liquid vaselin has given me by far the best results. In view of the increased interest which has been recently manifested in gastric ulcer and its treatment, the chance of parotitis developing after hemorrhage and during rectal feeding should be well recognized and avoided in the manner indicated. In all 3 cases reported by Fenwick and Rhodes the mouth had been neglected and was foul.

The Saliva in Health and Disease. The increasing attention paid to the secretion of the salivary glands has developed many interesting facts which indicate that the saliva occupies a more important position in the economy of the organism than was formerly supposed. Thus its part in gastric digestion is considerable, since it has been found by the investigation of Cannon[1] that the reaction of the food in the cardiac end of the stomach remains alkaline for a sufficient time to allow the diastatic action of the saliva to convert a much greater part of the starch of the food than was formerly thought possible.

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[1] PROGRESSIVE MEDICINE, December, 1904, p. 64.

Other investigations have shown that saliva, like bile, has important excretory functions and is not merely a lubricant and digestant.

Rudolf Fleckseder[1] has made a series of observations upon the chemistry of the mixed secretions as found in the mouth, as well as upon the clinical pathology of diseases of the salivary glands. He finds that usually the saliva is clearly alkaline and that the alkalinity increases with the taking of food. Sticker found, on the contrary, that the reaction might be acid in the later portion of the interval between meals, although the alkalinity was always increased after eating. Fleckseder found the reaction strongly alkaline in cases of acute uræmia, in chronic nephritis, and in gastric ulcer. An acid reaction in these conditions usually indicated the onset of some febrile complication.

In pneumonia, acute articular rheumatism, and malaria, rather curiously, the reaction was always alkaline.

In other forms of fever, especially in inflammatory conditions of the gastrointestinal tract and its appendages, such as perityphlitis, typhoid fever, and cholangitis, the saliva was often acid. The same reaction was observed in cases of severe diabetes mellitus, cancer of the stomach and other organs, severe pernicious anæmia, sometimes in chlorosis, and quite often in jaundice.

In pulmonary phthisis the early appearance of acid saliva is a bad prognostic sign in Fleckseder's experience, for in the early stages of that condition the reaction is usually alkaline. In the later stages it often becomes acid.

Fleckseder is disposed to think that in at least a part of his cases the alterations in the reaction of the saliva was connected with anomalies in the reaction of the blood. However, he is not disposed to go so far as Sticker, who explains the increased alkalinity of the saliva after meals by the increased alkalinity of the blood during hydrochloric acid secretion.

Fleckseder considers the saliva with respect to its ammonia, cyanide salts, reaction to stains, albumin, urea, sugar, acetone, and bile in cases of jaundice. He found the chlorides increased in the convalescence of acute disease, in tuberculosis, and diminished in most cases of parenchymatous nephritis.

The saliva retains its chlorides longer than the urine does in pneumonia and various conditions of inanition.

Anomalies of Secretion. Diminution in the amount of saliva (oligosialia) is usually a symptom of severe systemic disease, although a rare idiopathic form does occur, generally as one of the manifestations of neurasthenia.

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[1] Zentralblatt f. innere Medizin, 1905, vol. xxvi., No. 2.

It is seen in conditions leading to loss of the body fluids, as in diabetes, polyuria, profuse diarrhœa, uncontrolled vomiting, profuse sweating, and general anasarca. Also in high-grade cachexia and anæmia, carcinoma of the stomach, cirrhosis of the liver, pernicious anæmia, in high fever, and in uræmia.

The secretion is usually concentrated, often acid in reaction and not rarely has a peculiar sweetish odor. Complete suppression follows long-continued ptyalism.

Ptyalism or Increase of Secretion. The secretion is usually thin and watery, with diminished specific gravity and solid constituents. The reaction (in Fleckseder's experience) is always strongly alkaline.

Ptyalism may arise from local causes, such as diffuse stomatitis or chronic tonsillitis. It may be a sign of early pregnancy and occasionally follows coitus and nocturnal emissions.

Intermittent or remittent increase in saliva is sometimes reflex to recurring attacks of pain, as in angina pectoris, the crises of tabes, trigeminal neuralgia, and in gastric ulcer.

THE ŒSOPHAGUS.

The Diagnosis of Carcinoma of the Œsophagus. Since the experiments of von Mikulicz have shown that it is possible to operate successfully upon the intrathoracic portion of the œsophagus the study of the diseases of this portion of the body has been given a great impetus. The invention of the œsophagoscope doubtless has had something to do with the increase in the attention paid to the gullet, and there is no doubt that the assistance it renders in diagnosis is of great value. However, it is beyond the reach of the general practitioner, who is usually dependent upon the information which is derived from the stomach tube and sound in the detection of disease in the œsophagus.

Schütz's[1] study of the diagnosis of œsophageal carcinoma is based upon 100 cases, in every one of which the diagnosis was made by the sound, although the œsophagoscope was also used in a few instances toward the end of the series. The diagnosis was confirmed in every case by the subsequent course of the disease. The seat of the cancer was in the upper third in 10 per cent., in the middle third in 33 per cent., and in the lower third in 57 per cent., which corresponds closely to the figures given by Kraus[2] in 857 cases. The highest point (measuring from the teeth) in Schütz's series was 18 cm., the deepest 47 cm. Usually the growth was from 38 to 42 cm. from the teeth.

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[1] Zentralblatt f. die gesamte Therapie, 1904, vol. xxii. p. 225.

[2] Nothnagel's Hand-book.

The ages of his cases were as follows: Fifty to sixty years, 50 per cent.; sixty to seventy years, 24 per cent.; forty to fifty years, 18 per cent., with the rest scattering. The oldest was seventy-six, the youngest thirty-one years.

Schütz says that the diagnosis of œsophageal carcinoma does not always rest upon the presence of stenosis of the gullet. Carcinoma may be and very often is present without stenosis, sometimes even without much difficulty in swallowing. On the contrary, œsophagismus or spastic contraction may very closely simulate carcinoma in the difficult deglutition and the emaciation that is present.

Schütz does not recommend the use of the rubber stomach tube which is usually considered the softest and safest instrument with which to begin the examination of the œsophagus in a case of suspected carcinoma. He thinks that it is hard to overcome with it the slight spasm that is so often present in even normal gullets during the passage of the stomach tube; and since the operator is afraid to use any force at all, the tube does not reach the point of obstruction. Schütz believes that careful sounding with properly constructed bougies is safer than the use of the soft rubber tube, since the bougie is under absolute control, does not produce spasm, and is really not as dangerous as the solid and often quite sharp end of a stomach tube.

Schütz employs a bougie devised by Starck,[1] the tips of which are olive-shape, some straight, and some bent at different angles. The shaft is of rubber or silk with a steel director. The handle is marked so that the operator can tell in what direction the points of the bent tips are pointing. By studying the resistance at different points of the circumference of the œsophagus, growths can be detected which occupy only a part of the wall and do not run entirely around the circumference. The different angles of the tips enables the sound to enter strictures of which the opening is not in the centre of the tube or of which the lumen is tortuous.

The sound is inserted with the crook crosswise so as not to catch in the larynx, and then when the stricture is reached the tip is turned first in one direction and then in another until its point engages. If the growth occupies one side of the œsophagus only then the point will catch upon one side and not upon the other, and by manipulating it in different ways such a growth may be quite easily mapped out.

Symptomatology of Œsophageal Cancer. As has been said, not all of the cases of œsophageal cancer show stricture and, indeed, some of them even have no disturbance of swallowing.

Sometimes there are symptoms of stricture in the early stages that disappears later on, either because necrosis of the growth takes place and by the loss of tissue the obstruction is temporarily relieved, or because the obstruction is due not to the cancer itself, but to reflex spasm of the œsophagus, that undoubtedly occurs in the early stages of that disease and disappears later. However, cases have been described where stricture and interference with swallowing have been absent throughout the whole course. These have been called "latent œsophageal cancers." The absence of symptoms in such cases is often due not to any real latency, but to the fact that the growth affects only a part of the gullet wall, and the part that is not involved has the power of stretching to such an extent that the obstruction to the passage of food and liquids is not noticed, and also the ordinary straight sound following the healthy part of the wall encounters no obstruction. The bent tip of Starck's diverticulum sound would reveal the growth.

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[1] Münchener med. Wochenschrift, 1903, l., No. 4.

Probably another division of the cases of so-called "latent œsophageal carcinoma" is formed by malignant growth of the lower end of the tube. The old rule is that the cardia is 40 cm. from the teeth, but more recent authorities have shown that it may be 8 to 12 cm. longer. Unless this possible variation in the length of the œsophagus is kept in mind, a stricture of the gullet below the 40 cm. mark might easily be overlooked, and when the tube encounters the resistance produced by the stricture, the stoppage is thought to be caused by the entrance of the tube into the stomach.

This mistake is all the more probable because the symptoms of such cases differ decidedly from those of stricture farther up. There is distress under the lower end of the sternum and in the epigastrium and even deeper, and regular "vomiting" after eating. Schütz has repeatedly seen such cases treated for diseases of the stomach, without the passage of a tube, and even with the removal of a "test meal." The history of such cases is usually significant, because these patients invariably report that they can take fat meat better than lean, although exactly the opposite is true in most cases of true gastric disease.

Schütz has made this last observation a number of times, and is the first to put such a fact upon record. Of course, careful sounding, the recognition of the fact that the œsophagus is often longer than 40 cm., and careful examination of the supposed "stomach contents" would quickly reveal the true state of affairs.

In examining the œsophagus in cases of suspected carcinoma it must be remembered, as has been said, spasmodic strictures often occur in the early stages of cancer; so that the sound will encounter obstruction at different levels on different days. Usually this occurs above the seat of malignant disease; but Starck has reported two cases in which spasm occurred below the tumor.

Medical Treatment of Œsophageal Cancer. Schütz is strongly in favor of the systematic use of sounds in the treatment of cancer of the gullet. He has never seen harm arise from this method of treatment, and usually it is very quickly followed by increased power of swallowing, with subsequent improvement in nutrition. He does not believe in waiting until the obstruction is so great that fluids only can be swallowed, as advised by some authorities, but commences as soon as he is certain of the diagnosis. He employs Starck's diverticulum sounds and allows them to remain in the stricture for ten minutes. He uses the bougie every day at first and later every second day. In his experience there has never been a case in which the rapidity of the growth was increased or necrosis hastened by the use of the sound. Such processes are influenced more by the peculiarity of the individual case than by sounding. But when necrosis and bleeding are present to any extent the employment of the bougie is contraindicated. The best lubricant is pure olive oil. Indeed, the oil is an excellent remedy in such cases, since it usually passes the stricture with comparative ease, helps nutrition, and, if taken just before the sound is used, lubricates its passage.

Rectal feeding is occasionally used by Schütz to help nutrition, but he never employs it as the only means of feeding the patient.

In dilatation of the œsophagus above a stricture food and mucus often accumulate and, fermenting, produce irritation and much discomfort. This can be relieved by washing out the œsophageal sac with an ordinary stomach tube. Systematic sounding is the best means of relieving the stagnation, by increasing the lumen of the tube, but while this is being done lavage of the gullet adds greatly to the patient's comfort.

Olive oil in many cases seems to relieve irritation and passes the stricture easier than any other food. In general, oils and fat can be more comfortably swallowed and are of value in increasing nutrition.

In cases in which there is much pain, morphine is sometimes needed, and belladonna is occasionally of service in relieving spasm.

Rosenheim employs a 3 per cent. eucaine spray applied directly to the stricture by a rubber tube, through which a spray is thrown, when the pain is persistent.

The operative measures to be considered are: resection, external œsophagotomy with the establishment of a fistula in cases in which the obstruction is high up, and gastrotomy followed by retrograde sounding in low strictures.

Kraus[1] states that the period of life is certainly no longer in operative cases than when the disease is treated by systematic sounding. Besides, the discomfort of the patient is much increased by operation. Therefore, we would be warranted in regarding operation as a last resort and only to be advised when the stricture becomes impervious to fluids.

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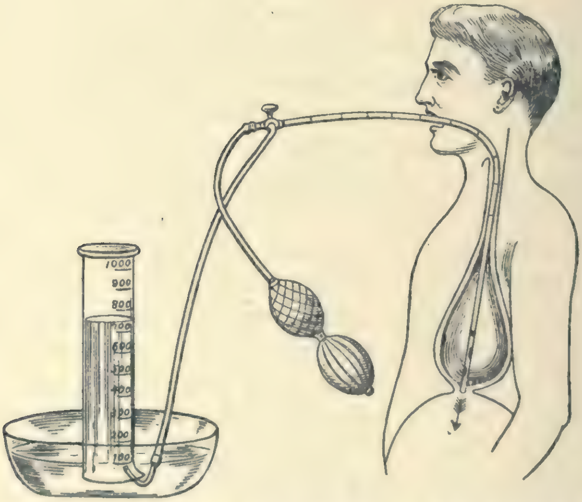
[1] Nothnagel's Handbuch, Bd. xvi., part i.

Exner[1] reports a series of cases in which the use of radium appeared to hasten necrosis and relieved obstruction.

Diagnosis of Cardiospastic Dilatation of the Œsophagus. Strauss[2] has improved the apparatus that he devised for this purpose and which he described three years ago.[3] It consists in the modified form of a sound which is widened at its lower end so as to make a sort of a balloon. The lower end of the tube is inserted into the stomach, which can be done more readily by gently inflating the œsophagus. The entrance of the tip of the tube into the stomach can be determined by listening for the blowing sound of the entrance of air into the stomach and by the fact that pressure upon the epigastrium will displace water in a jar connected with the sound (Fig. 1). The capacity of the dilatation can be measured by determining the amount of air required to fill the balloon. The pressure exerted by a deep inspiration will empty the balloon and facilitate the withdrawal. The diagnosis between a fusiform dilatation and a diverticulum is made by noting whether the tube passes directly from a dilatation of the œsophagus into the stomach or whether it has to be withdrawn a certain distance first before it will pass the cardia.

Fig. 1



Apparatus devised by Strauss for the estimation of the capacity of œsophageal dilatation and to differentiate simple dilatation from diverticula.

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[1] Wiener klin. Wochenschrift, 1904, li., No. 4.

[2] Berliner klin. Wochenschrift, 1904, xli., No. 48.

[3] Ibid., 1902, xxxix., No. 14.

The latter alternative always indicates a diverticulum. Strauss reports the case of a man, aged thirty years, who had presented symptoms of cardiospasm for ten years. At first there were slight attacks of difficulty in swallowing. These grew more severe in degree. Then he could only swallow when he washed the food down with liquid and had a feeling as if the food remained in the stomach.

He complained during this period of headache and general ill-being, but never of vomiting. After he had suffered in this way for four years he began to vomit, usually about an hour after eating, and especially upon exertion. He could swallow food only when he sat or stood up and never when he was recumbent.

The patient learned by experience that vomiting brought him relief, and he often resorted to it voluntarily.

The stomach tube introduced into the œsophagus showed evidences of stagnation and brought up a mixture of undigested food and mucus which was acid, apparently from the presence of lactic acid. It contained no free HCl and no pepsin. After gently inflating the œsophagus the tube was passed into the stomach, which it entered directly and not after being withdrawn first, indicating a fusiform enlargement and not a diverticulum. Stomach contents were withdrawn, containing no free HCl, but with a good amount of pepsin.

Strauss measured the capacity of the dilatation by inflation of the bag and found it to be about 350 c.c.

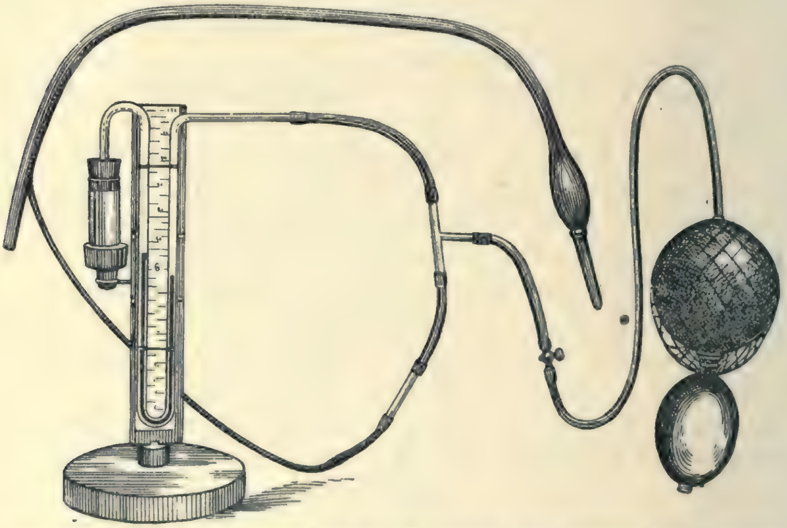
The patient was put upon rectal feeding with good amounts of oil, butter and milk by the mouth, with a teaspoonful of tannin four times daily. After three weeks the general condition of the man had greatly improved and he had gained nine pounds. Then the œsophagus was washed out with fresh water followed by silver nitrate solution, and the mouth feeding was increased. Six weeks after treatment was commenced there had been a gain of twenty-one pounds, the patient was free from pain, and the œsophageal contents no longer contained mucus, indicating a subsidence of the œsophagitis in the dilatation. Systematic dilatation of the cardia was then commenced, and this was kept up at intervals for several months.

Nine months later the patient was entirely free from symptoms and had gained twenty-eight pounds. However, examination showed that the œsophagus was still dilated, with a capacity of 420 c.c.

THE TREATMENT OF CARDIOSPASM BY DILATATION. In Strauss' methods all of the instruments employed are soft and flexible. One is a soft rubber, perforated sound with a hollow metal spiral guide ending 2 cm. from the tip. With this apparatus the œsophagus is gently inflated as the tube was introduced, favoring the entrance of the tip into the stomach. After this has been used for some time he employs another instrument which has a spindle-shaped balloon on the tube (Fig. 2). This is inserted with gentle inflation until it is shown to be in the stomach, by hearing the murmur of the air passing into the bag while in that organ.

When the bag has passed into the stomach it is inflated with a known amount of air to such a degree that its circumference is about 9.5 cm. Gentle traction brings the bag back through the cardia and accomplishes the dilatation. The pressure is regulated by a mercurial manometer, as is shown in the illustration, and should not exceed 250 mm. In Strauss' instrument the mercury escapes at that point. Dilatation should not be begun until all signs of inflammation of the œsophagus above the cardia have subsided. This is favored by gentle lavage of the gullet, rectal feeding, and a diet of milk and fats. The patient will usually not be ready for the systematic use of the sound for six weeks.

FIG. 2



Apparatus devised by Strauss for the treatment of cardiospasm by dilatation.

Radium in Diagnosis and Treatment. Einhorn[1] has employed a radium diaphane to illuminate the œsophagus, lungs, stomach, and bowel. He finds the method best suited for gastric diagnosis. The sides and back of the stomach can be quite easily penetrated by the rays.

A case of tumor of the stomach gave a shadow picture determining its outline.

Therapeutically, Einhorn has employed radium in *œsophageal carcinoma* (in 9 cases) and has observed some benefit from its use. No cures resulted, but a temporary widening of the stricture was obtained.

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[1] Medical Record, July 30, 1904.

Œsophageal Rupture and Œsophageal Mylacia. Since Boerhaave first described the rupture of the œsophagus in an apparently healthy individual twenty-five cases in all of this condition have appeared in medical literature. The clinical picture is a remarkably constant one. The cases are almost always men, generally alcoholics, and the rupture usually follows violent and continued vomiting, although one case occurred during difficult defecation. The symptoms are severe pain in the breast, rapidly developing dyspnœa, and subcutaneous emphysema, and, after a time, vomiting of blood.

The pathological findings are also remarkably alike in all the cases, namely, a longitudinal rupture of the œsophageal mucous membrane, sometimes reaching into the stomach, but generally stopping at the cardia. The rupture occurs oftenest in the posterior or lateral portions of the tube, rarely in the anterior. The muscularis is sharply torn as well and communication is established with the mediastinum and left pleura, rarely with the right. There are stomach contents in the pleural cavity, more or less congestion of the lungs, interstitial emphysema, and blood clots in the lumen of the gastrointestinal tract. Great doubt has been expressed as to whether the rupture ever occurs in a perfectly normal œsophagus, and it is believed that there is not always some softening process present when the force is exerted.

Beneke[1] has satisfied himself by his examination of the œsophagus from the case reported by Leyden, which specimen is still in the museum at Königsberg, that this case at all events is a pure example of spontaneous rupture of an entirely normal œsophagus. In most of the other cases reported it seems certain that no previous disease of the œsophagus existed. Indeed, Beneke has proven experimentally to his own satisfaction that no great amount of force is needed to rupture the œsophagus, if the pressure is applied suddenly and not slowly, as in most previous experiments. So there is really no need to seek for any other cause than violence for such cases of spontaneous rupture. There is, however, a form of spontaneous rupture accompanied by œsophageal softening which occurs in the agonal stage of various diseases, especially of the central nervous system. This variety is of great interest not only clinically as explaining the mode of death, but physiologically as well, since it is probably an instance of autodigestion. The problem in such cases is to determine whether or not the process is intra vitam or postmortem. Beneke examined eleven cases of spontaneous rupture in cases of meningitis and found that microscopic examination of the tear in the œsophagus showed round-cell infiltration around its edges, proving satisfactorily that the rupture had occurred before death.

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[1] Deutsche med. Wochen., 1904, vol. xxx., No. 41.

A number of such cases of agonal rupture have been reported, one of them by Beneke, but in the absence of microscopic examination of the tear it is impossible to tell whether or not they were intra vitam, though the chances are in favor of their so being.

One important clinical method of investigation was neglected in all of them. The signs of hydropneumothorax were present during life, and autopsy showed air and fluid in the pleural cavities. However, no puncture was made before death, and we cannot be certain what the original nature of the fluid was. If it had been shown to be stomach contents, it would have been proved past a doubt that the œsophageal rupture was antemortem. As this was not done, it is uncertain whether or not the fluid was a rapidly forming effusion. The needle should be used to settle this point in all future cases.

The mechanism of antemortem softening and rupture is best explained as follows:

The very much weakened patient vomits and, on account of the recumbent position, and probably always because there is some narrowing of the upper œsophagus, such as would be caused by an enlarged thyroid or bronchial gland, a certain amount of gastric contents remain in the œsophagus. The lowered vitality of the tissues favors autodigestion and softening, and finally renewed vomiting resisted by the narrowing, if that is present, produces the rupture.

The theory of Zenkers and Brosch that there must be some vascular spasm in the œsophageal mucous membrane producing a local anæmia before autodigestion can take place is not capable of demonstration, and, indeed, unnecessary. Beneke has proven by experiments upon dogs that autodigestion occurs when gastric contents are retained for a period of four hours in the œsophagus.

The whole question is important and interesting perhaps more from a pathological than from a therapeutic standpoint.

THE STOMACH.

Gastric and Intestinal Crises. Gastric crises are only occasionally associated with primary stomach affections and are much more frequently reflex symptoms of organic disease in other parts of the body.

By far the most important cause of such attacks is sclerosis of the posterior columns (tabes dorsalis) and a very interesting and important fact is that the attack usually occurs in the early stages of tabes before the classical symptoms of that disease have developed.

Ewald[1] has observed 50 cases of typical gastric crises during the past year and bases upon their study a summary of the symptomatology and treatment of the condition.

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[1] Zentralblatt f. die gesamte Therapie, 1904, Bd. xxii. p. 505.

Syphilis was undoubted in 16 of 26 cases, was denied by the patient in 7, and was doubtful in 3. So 62 per cent. of the cases of gastric crises had a syphilitic history—a point that is of value in the differential diagnosis. The attacks of gastric distress always came in shortening intervals. At first they were sometimes one and one-half years apart; then one year, then six months, and then only fourteen days. Finally, they recur every other day or so.

Each attack tends to become longer with each recurrence, lasting at first thirty minutes and finally running over twenty-four or even forty-eight hours. Sometimes the crises are so close together that practically one attack lasts two or three weeks. The character of the crisis also varies. Usually it is ushered in by cramps in the epigastrium and over the stomach, accompanied at first by slight nausea, later by vomiting that is very excessive and extraordinarily painful. The vomitus at first consists of particles of food, then of mucus and bile, and finally may be streaked with blood. Vomitus of pure blood (Charcot's black vomit) is rare, but Ewald has seen it in 4 cases, twice associated with melæna.

Usually the attack comes on like lightning and leaves as quickly, so that the patient, who has been doubled up with pain one moment, the next sits up in bed and demands food.

In other cases the onset of the crisis is slower and the after-effects are more disagreeable. Ewald has observed a sort of aura which consists of pains in the breast and back, and a sensation of constriction and depression.

The pain, as a rule, is very severe and almost unbearable, but was entirely absent in 2 of Ewald's cases in which the only symptom was vomiting and vertigo. In 1 case deep stupor accompanied the attack. This patient had also a well-marked gastric dilatation as a constant condition. The severity of the attacks varies considerably even in the same individual, and mild crises may alternate with very severe ones. It is surprising for how long a period these crises may antedate the onset of the first typical symptoms of tabes. One of Ewald's cases was under observation for five years and had five attacks before the first sign of spinal disease developed. In another the period was ten years.

The attacks usually diminish in intensity with the onset of true tabes. Still, cases do occur in which the crises grow more severe instead of lessening and then form a very serious complication of the primary disease.

Gastric secretion as shown by a test meal is usually not much affected, but when any modification does occur hydrochloric acid is oftener increased than decreased. Usually there are no disturbances of the function of the gastrointestinal tract in the intervals between the attacks, though Ewald has seen diarrhœa after the crises in two cases. There is no change in the urine.

Another form of the condition is characterized by cramp-like contractures of the abdominal muscles instead of gastric pain, especially of the hypogastrium, which is accompanied by the most intense cramp-like and tearing pains. The abdomen is board-like and often scaphoid. In many cases knots of intestines can be felt in the ileocæcal fossa or over the pubis which relax with a bubbling murmur. Such attacks seldom last longer than a few moments and often recur several times in one day, apparently with some periodicity. In the interval the abdomen is normal.

Intestinal and rectal crises may also occur that correspond in a general way to gastric crises, except that they come later in the course of the disease after well-marked tabetic symptoms have developed. They are sudden in onset and subsidence and are characterized by intense burning and boring pain in the intestines or rectum. As a rule, patients that have gastric crises do not have the intestinal or anal form and *vice versa.*

The diagnosis of these gastric and abdominal crises due to tabes is a matter of great difficulty and of equally great practical clinical importance. They can be very easily confused with other conditions producing paroxysmal gastric pain and vomiting, among which are lead colic, severe morphinism, pregnancy, pain due to hepatic or renal colic or vesical calculus, malaria and various intestinal and uterine diseases. Mistakes in diagnosis are only too common and Ewald refers to a case in which he has made the diagnosis of tabetic crises. A surgeon later pronounced it a case of gallstones, operated, and found nothing.

Still more instructive is a case reported by Werner.[1] A woman had suffered for three years with paroxysms of the type of gastric crises. First a diagnosis of pregnancy was made and the cervix was dilated without finding a fœtus and with no benefit to the attacks. Then the symptoms led to a diagnosis of gastric dilatation from gastric ulcer and pylorospasm and a gastroenterostomy was done. Then the attacks were thought to be reflex from ovarian trouble and both ovaries were removed. Finally all the symptoms of a true tabes developed four years after the attacks commenced. The patient died in a short time of phthisis and the autopsy revealed a typical tabes dorsalis.

The differential diagnosis is most difficult because, as has been said, these crises may appear before any of the classical symptoms of tabes.

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[1] Inaug. Diss., Berlin, 1889.

The main points by which we can hope to recognize the true source of the disease are: the development of the attacks, which occur at long intervals at first and gradually grow more frequent; a history of syphilis in more than half the cases; the character of the paroxysms, which are abrupt in onset, with boring and tearing pains, associated with vomiting, although in some cases either the vomiting or the pain may be absent.

The diagnosis is often difficult between these crises and those of somewhat similar nature that occur in other diseases of the central nervous system, such as general spinal paralysis, multiple sclerosis, and compression of the cervical cord. In crises due to these later conditions the characteristic symptoms of the primary disease are usually well developed when the attacks occur, while in tabetic crises this is not the case.

The condition most closely simulating tabetic crises is the form of periodic nervous vomiting without organic lesion described by Leyden and Boas. The points of difference are: (1) The periodicity of the functional vomiting, which usually occur near menstruation and especially in the spring and fall and in young women. The patient in such cases is almost always anæmic and pale, with poor appetite, coated tongue, etc. (2) There are absolutely no signs of spinal disease and none develop, but there are signs of neurasthenia and hysteria. (3) The attacks usually occur after eating. (4) The functional vomiting improves under treatment, while the tabetic crises do not.

The *treatment* of tabetic gastric crises is unsuccessful and unsatisfactory. Ewald has tried a large number of remedies and measures directed against the gastric attacks and also against the primary disease without success. This includes suspension, mercury, silver nitrate, antipyrin, and cerium oxalate.

In severe cases morphine cannot be dispensed with. It is best given in small doses at first, which must be increased in severe cases or in those of unusual length. Sometimes in an unusual patient we may find that a dose of morphine is required far above the maximum, which reveals the opium eater. As in all recurring paroxysms, the habit is unfortunately too easily acquired, and it is safest for the physician to keep its administration in his own hands. The injection of anæsthetics into the spinal canal has been advised and practised by Chatelin,[1] who injects a solution of cocaine under the dura of the cord in the sacral region. Ewald has used the method in many cases and finds it very simple and without bad results, but is not sure that it benefited the attacks of gastric pain.

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[1] Annales des maladies des organes genito-urinaires, April, 1903.

The treatment of periodic idiopathic vomiting which is dependent upon functional neuroses is much more satisfactory. Here tonics, hygienic and dietetic measures, with iron and arsenic, usually give relief in time. Local treatment by washing out the stomach with chloroform-water or solutions of argentic nitrate is often of benefit. During the attacks various sedatives are indicated, such as the bromides, hyoscyamus, or orthoform. Some cases of idiopathic vomiting are very obstinate, and patients that are greatly run down may resist treatment for a long time.

The response to proper measures, slow as it sometimes is, may be the only means of distinguishing these cases of idiopathic vomiting from tabetic crises.

Arteriosclerotic Abdominal Pain. Max Buch,[1] from a study of 25 cases collected from literature and from his own experience, has drawn the clinical picture of pain arising in cases of splanchnic arteriosclerosis. The significance of this symptom-complex has not been recognized until within the past few years, and yet arteriosclerotic pain is probably comparatively common and is a more frequent cause for paroxysms of epigastric pain in elderly people who have arteriosclerosis than is organic disease of the gastrointestinal tract itself. Sclerosis of the arteries of the brain, kidney, heart, and extremities have each their own well-known set of painful symptoms, but our knowledge of the paroxysm arising from abdominal atheroma has been very confused, and this work by Buch puts the subject in a much clearer light. Paroxysms of abdominal pain were the essential characteristics of all the cases tabulated, but Buch divides the condition into two varieties, depending upon the relation of heart symptoms to the abdominal ones.

Arteriosclerotic Cramp. In this form there is severe abdominal cramp occurring paroxysmally in persons past forty years of age. It is generally localized just above the navel, rarely just below it. The paroxysms resemble the text-book pictures of gastralgia, except in the conditions which determine the attack. The pain may last only a very few minutes, less often a half-hour or more. The tendency is to recur frequently, often many times in a day. The paroxysms are brought on by circumstances that indicate their arteriosclerotic origin and that are strikingly similar to those introducing attacks of angina. Almost every attack may be traced either to overexertion, emotional disturbances, or to assuming the horizontal position. Walking or going up and down stairs are frequent causes and one-fifth of all the paroxysms in the tables were induced by lying down. Attacks of true angina pectoris sometimes occurred between the crises of abdominal pain, but in this form of the disease cardiac and abdominal pain do not occur together. In almost all the cases there was a general peripheral arteriosclerosis and accentuation of the second aortic sound. No studies in blood pressure were made. The abdominal aorta was never dilated or misplaced, but it was almost always tender, and this sensitiveness was quite as marked over the larger branches as over the aorta itself. The point of tenderness in Buch's own cases generally corresponded to the seat of spontaneous pain; 14 of the 25 collected cases belonged to the above class of simple abdominal cramp; 7 of these were under Buch's own personal observation. He found that diuretin, 3 or 4 gm. (45 to 60 gr.) daily, and strophanthus, 15 to 24 drops daily, acted almost as a specific—so much so that he advises the use of these two remedies as aids in diagnosis.

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[1] St. Petersburger med. Woch., 1904, vol. xxix., No. 27, and Archiv f. Verdauungskrankheiten, 1904, vol. x., No. 6.

In the second class of cases the epigastralgia was one of the manifestations of a true angina pectoris or anginoid attack. The occurrence of abdominal pain in certain forms of angina pectoris is a well-recognized phenomenon and has been described by v. Schrötter and Huchard. The epigastric pain may initiate the attack or the pain may radiate there from the præcordium or, finally, there may be no heart pain at all and the cardiac origin of the epigastralgia is indicated by arhythmia, slowing of the pulse, and even neuralgic pain in the head, shoulders, and arm similar to the radiation of a typical angina. In this group of cases the general health and the condition of the circulation was not as good as in the other form, and œdema, abdominal effusion, and other signs of failure of the cardiac muscle were almost always present in the cases under Buch's own observation. Buch has the same confidence in strophanthus and diuretin here as in the simple sclerotic cramp. Usually there is no disturbance of digestion, and the taking of food bears no relation to the onset of the pain except that too large a meal may precede an attack. Several cases of arteriosclerotic cramp in which a diagnosis of gastric ulcer was made have been reported. The differential diagnosis in such cases would rest upon the absence of pain after an ordinary meal, which is present in arteriosclerotic pain and is absent in ulcer. The fact must not be overlooked, however, that splanchnic arteriosclerosis may be a cause of gastric ulcer. In the two or three examinations of stomach contents made the results were inconstant, there being sometimes a hyperacidity, sometimes a subacidity. There was usually no disturbance of motility. To epitomize: Arteriosclerotic pain is probably a frequent affection. Attacks of epigastralgia in elderly persons are caused probably more often by splanchnic arteriosclerosis than by organic disease of the gastrointestinal tract. The diagnostic points are the fact that the pain is brought on by exertion, emotion, and assuming the horizontal position and not by food, and, if we accept Buch's statement, the fact that arteriosclerotic pain is invariably relieved by diuretin and strophanthus.

Buch thinks that the source of the pain is neuralgia of the abdominal sympathetic.

Advances in the Chemistry of Digestion. ANTIENZYMES. The enzymes or soluble ferments occupy perhaps the most important place in the investigations into the chemistry of the gastrointestinal tract in recent times. Much has yet to be learned of their physical and chemical properties, but many facts about them are of very great interest and point toward still more important and practical discoveries in the future.

It seems probable that these soluble ferments are specific in their action and that antienzymes exist capable of resisting their action. Thus, Weinland,[1] in studying the nature of the resistance which intestinal parasites offer to the digestive juices in which they exist, has come to the conclusion that the parasites elaborate specific substances which inhibit the action of pepsin and trypsin or, in other words, antienzymes.

Proceeding along the lines of investigation suggested by this discovery, Weinland found that extracts of the stomach and pancreas, like extracts of intestinal parasites, have the power of checking the proteolytic power of pepsin and trypsin in tests outside the body. The inference is that such antienzymes have the power of protecting the body against its own digestive juices and prevents autodigestion.

We can only surmise the bearing of this discovery upon the pathology of the gastrointestinal tract, but many interesting possibilities are suggested.

For instance, if these antienzymes are absent in a certain area of the gastric mucous membrane from some pathological process that we do not yet understand, would not autodigestion take place with the formation of a gastric ulcer?

A SPECIFIC GASTROTOXIN. In an attempt to investigate the pathology of gastric ulcer Charles Bolton,[2] research scholar of the Grocers' Company of London, has apparently demonstrated the formation of a gastric toxin in blood serum by subcutaneous injections into one animal of an extract of the gastric mucous membrane of another animal.

The injected animals always showed symptoms of depression and shock, but recovered unless the dose was a large one or bacterial infection took place. After a short time a toxic substance appeared in their blood that had an affinity for the mucous membrane of the stomach where it produced necrosis with hemorrhage. It is possible that the presence of some such specific toxin in the blood of human beings may determine the formation of gastric ulcer.

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[1] Zeitschrift f. Biologie, 1902, Bd. xliv. p. 1.

[2] Proceedings of the Royal Society of London, 1905, vol. lxxiv., pp. 135–147.

This toxin might be formed by the absorption of its own cells or, what appears much more likely, the absence of some antibody that normally controls such processes.

Serum Diagnosis of Carcinoma of the Stomach. The experiments to develop an accurate method are as yet not wholly satisfactory. The test is briefly as follows: The washings of the stomach containing albumin from a case of carcinoma ventriculi is obtained after the method of Salomon.[1]

Rabbits are injected twice a week with 10 to 15 c.c. of this washing, ten or eleven injections being given in all. The resulting immune serum is then treated with small amounts of a solution of human blood. A slight precipitate is formed, which is removed by centrifugation.

This clear, immune rabbit serum is treated with the stomach washings to be examined obtained by Salomon's method. A precipitate indicates cancer of the stomach, and if it does not form then the washings are not from a carcinomatous stomach. If this method proves accurate it is a very valuable addition to our methods of diagnosis. It would differentiate ulcer from carcinoma which Salomon's method does not do, and would be an ideal test to distinguish simple ulcer from carcinomatous ulcer. I cannot see how it can prove of value in the early diagnosis of cancer of the stomach, for the washings do not bring away albumin unless the carcinoma has ulcerated, which infers a comparatively late stage of the process. However, it may be possible to remove this objection by obtaining the serum to be tested by some other method.

Increased Nitrogen and Albumin in Stomach Washings and its Clinical Significance. The method devised by Salomon for the diagnosis of carcinoma of the stomach by estimating the albumin and nitrogen in the washings from the empty stomach was described in PROGRESSIVE MEDICINE December, 1904.

Berent and Gutmann[2] have confirmed these observations in a series of 32 cases of various gastric lesions in which the test was applied. Their list included 8 cases of cancer in which the diagnosis was confirmed by operation or autopsy or by the subsequent course of the case. Washing the empty and clean stomach with normal salt solution showed a nitrogen content in the wash-water of 84 to 79 mg. of nitrogen in 100 c.c. of wash-water and three-fourths per cent. of albumin by Esbach's method. One of 6 cases of gastric ulcer showed the same increase in nitrogen and albumin, but in no other disease of the stomach could albumin be found in the wash-water. The fact that even one case of gastric ulcer gave an amount of albumin and nitrogen equal to that obtained in carcinoma renders Salomon's test of no value in the differential diagnosis between simple ulcer and carcinoma, and so the method will not show whether an ulcer is undergoing carcinomatous change. The presence of albumin in the wash-water depends upon ulceration, and so the test will not show the presence of a diffuse and non-ulcerated carcinoma. Even with these drawbacks Berant and Gutmann believe that the method will occasionally be a help in the early diagnosis of carcinoma of the stomach.

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[1] PROGRESSIVE MEDICINE, December, 1904, p. 46.

[2] Deutsche med. Wochenschrift, 1904, xxx., No. 28.

A New Method of Detecting Gastric Motor Insufficiency. The presence of a considerable amount of food in the fasting stomach in the morning is a sign of decided motor insufficiency and the condition is therefore an easy one to detect in its more advanced stages. The milder grades, however, are exceedingly difficult to diagnose and a number of methods have been devised for this purpose without any of them giving full satisfaction. Such are Sahli's method, and the salol, iodopin, and desmoid tests.

One of the more recent methods is that devised by Mathieu and Rimond, which consists in washing out the stomach one hour after a test breakfast and determining the motor function by the quantity of the breakfast remaining. These observers found that not more than 180 to 200 c.c. from 500 c.c. ingested should be found after an hour's interval in a healthy stomach. However, this method would be rendered inaccurate by the presence of hypersecretion of gastric juice, since the amount of contents in such cases would be much higher than normal, owing to the hypersecretion even if the motility were normal.

Moreover, a combination of motor insufficiency and hypersecretion is very common, and in these cases the amount of contents may be greater than the original breakfast. Consequently motor insufficiency cannot be differentiated from hypersecretion by means of the Mathieu and Rimond method.

Elsner[1] has devised a modification of the Mathieu-Rimond method by estimating not only the total amount of gastric contents remaining after a test breakfast, but also the amount of solid material remaining. And he claims that by comparing the two amounts he can usually differentiate clearly between insufficiency and hypersecretion.

His method is as follows: A test meal is given, consisting of 60 gm. of white bread and 400 gm. of water. This is removed after one hour. The total amount in cubic centimetres is called *b*. Its total acidity is *a*. Then 200 cm. (q.) of water are poured through the tube and it is moved up and down to thoroughly mix it. The contents are again removed and its total acidity is a'. The stomach is then thoroughly washed and the wash-water is saved.

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[1] Berliner klin. Wochenschrift, 1904, Bd. iv., No. 25.

The total amount of contents remaining is then estimated by an algebraic formula suggested by Mathieu and Rimond:

$$x = B\frac{a'q}{a-a'}.$$

The whole gastric contents (test meal and wash-water) are then put to settle in two or three large graduates, and after twenty-four hours the amount of solid residue is read off in cubic centimetres.

It is absolutely necessary for the even settling and ready estimation of the solid contents that the test breakfast be taken in a finely divided state so that chymification may be even and without large lumps.

Elsner has found that if the bread is soaked and finely divided before taking, and then remains in the stomach for an hour, the error in estimating the solid particles by settling is very small (not above 20 c.c.).

However, frequently excessive formation of mucus and unevenly divided test meals make the estimation of the solid residue very difficult, especially when the HCl secretion is diminished or absent. In such cases it is better to artificially break up the solid residue mechanically before it is put to settle.

In his list of individuals without marked gastric symptoms the total contents varied from 90 to 250, but averaged about 150, while the solid residue varied from 30 to 100, and varied in the same person on different occasions.

In general it may be said that the solid residue should be 100 c.c. or under. An increase over this amount should indicate a motor insufficiency.

When an increase in the solid residue occurs without increase in the total amount the condition is probably one of uncomplicated motor insufficiency.

Much more common than these uncomplicated cases are those in which motor insufficiency has led to an increase in secretion. In such cases there is an increase in the total amount as well as in the solid residue. As in the following cases:

Total contents	321	Solids	140
" "	389	"	110
" "	358	"	120

The application of the method in cases of anacidity and achylia will of course be simpler, as the relation of the total amount and solid residue will not be disturbed by excessive secretion.

Elsner recommends his method as a practical one for estimation of the gastric motility, but warns against supposing that it is anything but an approximate test. Future investigation may show that there are other conditions influencing the retention of the solid food particles.

The diagnosis between *motor insufficiency* and *alimentary hypersecretion* has up to this time been considered an extremely difficult one to make,[1] but by this method Elsner claims that they can be easily and sharply differentiated by noting the relation of the total amount of stomach contents to the solid residue.

The Desmoid Reaction. A new test for the functions of the stomach. Sohli[2] has devised a method to test the activity of gastric digestion. It consists in the ingestion of some stain such as methylene blue or of iodine wrapped in a covering which is only digested by gastric secretion. Then the saliva is tested for iodine, or the urine for methylene blue, and a late appearance of these substances in the secretions indicate a lack of digestive power of the stomach. Sahli first employed as a cover small pieces of goldbeaters' skin, which is pure connective tissue from a cow's intestine. Such fibrous tissue can only be digested by gastric juice. He enclosed 1 gr. of iodoform in a square of the skin and tested the saliva for iodine, which should appear in a few hours. A series of observations upon 92 cases confirmed the accuracy of the test.

He has since modified the technique, since he found that the goldbeaters' skin varied so much in thickness that the tests were not uniform.

He now employs the finest rubber dam, such as is used by dentists, which he ties around the stain with soft catgut, making a little bag. The digestion of the catgut liberates the stain if the rubber does not stick together. To obviate this he takes a piece of rubber 4 cm. square and dusts it thoroughly with talcum powder. In this is placed a pill containing 7 grains of methylene blue and 1 grain of iodoform. The corners of the square are brought together and tied. Then the rubber is trimmed off close, with care to cut each thickness of rubber separately. The mass is heavier than water and sinks to the bottom of the stomach. It should be given at midday and the urine tested at 5 and 7 P.M. by looking for the blue color produced by the excretion of the methylene blue, and again in the morning. The saliva should also be tested for iodine. When gastric digestion is normal the urine shows the stain the same day, provided that the kidneys are intact.

A positive reaction always indicates normal gastric digestion, according to Sahli. A negative reaction in his experience indicates some disturbance of stomach digestion. Experiments performed outside the body have convinced him that nothing but a combination of pepsin and HCl will digest the catgut.

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[1] Progressive Medicine, December, 1904.

[2] Correspondenzblatt f. Schweizer Aerzte, 1905, Bd. xxxv., Nos. 8 and 9.

An Experimental Study of the Accuracy of Modern Clinical Methods for the Diagnosis of Disorders of the Stomach. Henry F. Hewes[1] has devised another method of detecting stagnation in the stomach. His test shows only very decided motor insufficiency and stagnation and cannot reveal less severe grade of the condition. It is simply and easily applied, though it introduces no new principles of diagnosis. An ordinary meal is employed (corresponding in general to the Leube meal), which is given at 6 P.M. The tube is passed at least twelve hours later and the stomach contents are withdrawn. Hewes finds in the normal stomach under these circumstances an amount of fluid varying from a few drops to 40 c.c. If more than this is obtained it should be considered pathological. Material from Hewes' cases was examined microscopically, with the naked eye, and chemically. The conditions indicating stagnation were: (1) The presence of an abnormally large solid food residue. The merest trace of food was found in the normal stomach, but more than this signifies some retention. All but 2 of Hewes' 26 cases of stasis showed the presence of good amounts of solid food residue. (2) The presence of sarcinæ, which were found in 7 of the 26 stasis cases, in all of which there was considerable free HCl. (3) The presence of lactic acid indicates, as Hewes thinks, a considerable degree of stagnation and fermentation. It was present in 8 of the 26 cases of retention. In the only 2 cases showing lactic acid in which the diagnosis was confirmed cancer of the pylorus was found. (4) The presence of abnormal yeast fermentation. This Hewes tests for by adding 10 or 20 c.c. of gastric contents to half the quantity of sterilized 10 per cent. glucose solution. This is placed in any fermentation apparatus (merely an inverted test-tube quite filled with the mixture would do) and the whole allowed to stand in a warm place, preferably in an incubator at 37° C. It is examined at intervals of twelve hours for two days. If more than one-twentieth of the tube is filled with gas after forty-eight hours, then the sediment in the tube must be examined under the microscope, and if this shows freshly budding yeast plants, then the test for excessive yeast fermentation may be considered positive. If less gas than one-twentieth forms the test is negative. According to Hewes, if any one of these tests are positive then stagnation exists and they must all be absent before stagnation can be excluded. Sarcinæ and excessive yeast fermentation were not as often present as solid food residue is in Hewes' cases of retention. But the presence of sarcinæ and yeast is conclusive of stagnation, even when they are found in the fasting stomach or vomited material, differing in this respect from solid food residue, which must be found after twelve hours of fasting to have any significance. Hewes has examined 180 cases of all sorts in which he demonstrated stagnation in 26 by the above method; 21 of the cases in which the diagnosis of retention was made came to autopsy or operation, and in all of them obstruction of the pylorus was demonstrated. In 18 cases without stasis no obstruction and presumably no retention was found.

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[1] Boston Medical and Surgical Journal, 1905, vol. clii., No. 24.

While Hewes' conclusions are in no way new, he has tabulated several well-known symptoms of retention in such a way as to make them easily applicable clinically and has supported his observations by an interesting series of cases.

Ischochymia and its Treatment. Einhorn has described in two previous papers the condition that he calls by this name. For the benefit of those who have not had the opportunity of reading these communications ischochymia may be defined as clinical dilatation of the stomach with decided retention, and arising from a variety of causes, but usually from pyloric stenosis, which may be benign or malignant. The important part of Einhorn's work is his description of the form of pyloric stenosis, which greatly improves under treatment, although the symptoms are usually severe enough to suggest serious organic stenosis. To quote Einhorn's own explanation:

"The cessation of the symptoms due to the stenosis may best be explained as follows: Let us assume that the pylorus is only slightly narrowed (relative stenosis of the pylorus), so that the usual food passes readily. Through some grave dietetic error an inflammation of the pyloric part takes place, which causes an hyperæmia, perhaps an œdematous swelling of this part of the stomach, and the result is that the canal is nearly impassable. The whole process may best be compared to an angina of the throat. If now, by means of rest and suitable treatment, the acute swelling is made to disappear the former lumen of the canal will be re-established."

In his most recent paper[1] Einhorn gives the statistics of the affection and reports a number of cases illustrative of the various characteristics:

1. Benign ischochymia associated with serious peristaltic unrest of the stomach cured by medical methods.

It is now generally known that cases of this description which are caused by a moderate stenosis of the pylorus may be improved or cured by medical means alone. In these cases dilatation is not very great and the peristaltic restlessness is absent or only slightly present. Not only these milder forms but even cases of tremendous dilatation with marked unrest and retention can be cured by palliative treatment.

2. Cases of ischochymia with a history of short duration and even

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[1] American Medicine, June 3, 1905.

with tumor formation that proved not to be malignant. Usually in cases of benign ischochymia the patients give a long history of suffering with periods of comfort, whereas cases of malignant ischochymia show a short history (three to eight months), with constant suffering. Einhorn reports 2 cases in which such a course was very suggestive of cancer, but which recovered completely.

The presence of a tumor in such cases is usually supposed (and rightly so) to point almost conclusively to malignancy. Yet Einhorn reports 2 cases, both men, aged thirty-six and forty-five years respectively, in which tumors were present with dilatation and peristaltic restlessness. Operation in both showed a tumor of the pylorus that was diagnosed cancer by the surgeon.

The abdomen was closed without interference in the first case and gastroenterostomy was done in the second. Both recovered completely under Einhorn's treatment, proving that the tumors could not have been malignant.

3. Cases of benign ischochymia with ulcer at the pylorus and continuous hypersecretion. Cases of this sort are occasionally encountered in which there are three stages of the disease. There is hyperacidity for years which is more difficult to treat than is the ordinary form and shows a tendency to recur. This leads us to the discovery that hyperacidity has turned into hypersecretion. There is much pain and perhaps vomiting. After hypersecretion has lasted for a year or more dilatation occurs. This forms the third and gravest period of the disease.

In these cases there is usually an ulcer near the pylorus (either in the stomach or duodenum). Medical treatment is usually of no avail in this form of ischochymia with stenosis and ulceration, and operation is almost always indicated. In the past few years Einhorn has observed 6 pronounced cases of this type, in all of which he strongly advised operation after the symptoms had persisted even after rectal feeding and liquid diet.

Three were operated upon, of these 1 died soon after the operation and the other 2 recovered and were entirely free from all symptoms. The other 3 refused any surgical interference. Of these 2 died, 1 from a perforation and the other from a duodenal hemorrhage, while the third slowly improved and almost entirely regained his health.

THE TREATMENT OF ISCHOCHYMIA. Einhorn's own words are concise and comprehensive: "There are two ways of treating ischochymia: dietetic and medicinal measures (rectal alimentation, fluid diet, lavage of the stomach, bismuth, etc.) and operative procedures (gastroenterostomy, pyloroplasty).

These two methods of treatment do not antagonize but supplement one another. The indications for both are fairly well determined; where one ceases the other begins.

Since in by far the larger number of cases of ischochymia a stenosis of the pylorus is present the ideal method of treatment would consist in forming a new passage for the exit of the chyme from the stomach. Yet surgical intervention ought not to be recommended immediately in every case, as a certain element of risk is still attached to this procedure. The mortality of gastroenterostomy and pyloroplasty is rather high. It varies among different surgeons and in different countries between 5 per cent. and 20 per cent. If we assume 10 per cent. as the average (among my own patients the mortality was much higher), we see that we have a mortality percentage that ought to be taken into consideration in advising an operation."

The indications for medical and surgical treatment of ischochymia may be placed as follows:

1. Benign ischochymia requires first medical treatment; if this be unsuccessful—*i. e.*, if after a longer period of treatment the fasting stomach, on a fluid diet, is not empty but contains food remnants—an operation is advisable.

2. Surgical intervention is also indicated in benign ischochymia which has developed subsequent to a condition of continuous hypersecretion of gastric juice (preceded by hemorrhage or not).

3. Malignant ischochymia or one of dubious nature in which, however, a thickening of the pylorus is found, should also be treated surgically (gastroenterostomy, and, if possible, resection of the pylorus).

The Motility of the Stomach in Achylia Gastrica. Elsner[1] employed his method to estimate the gastric motor sufficiency in a series of cases of simple achylia and found that the motility varied very much in different cases. This confirms what most of the best authorities have always assumed, namely, that gastric motility is good in cases without gastric symptoms, the intestines assuming the function of the stomach.

The Action of Hydrochloric Acid and Pepsin and Gasterine in Hypoacidity and Achylia. The question as to whether artificial stomach digestion should be attempted at all in cases when gastric secretion is entirely suppressed has been much debated. The alternative is to leave the whole digestion of the food to the intestine. Personally, I have always seen good results follow the administration of hydrochloric acid in such cases except in the rare instances when there is a hyperæsthesia of the gastric mucous membrane and in which the acid produces discomfort.

The recent observations by Heichelheim and Kramer[2] support this view. They have investigated the action of hydrochloric acid and pepsin and also of *gasterine* (a new proprietary preparation which is made from the gastric juice of dogs) by the method introduced by Pawlow, in which a so-called secondary stomach is formed so that the gastric juice can be obtained perfectly pure and unmixed with food. In the first part of the investigation they compared the gasterine which was obtained from Paris with the gastric juice obtained from dogs in their own laboratories by the technique mentioned. They found that the gasterine was very active both in free acid and in pepsin. The free acid of the pure juice was between 100 and 150, and the pepsin, according to the old Metts method, was 4 to 5, while in the gasterine the free acid was 94 and the pepsin 2.8.

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[1] Deutsche med. Wochenschrift, 1904, Bd. xxx., No. 42.

[2] Münchener med. Wochenschrift, 1904, Bd. li., No. 32.

The points they desired to investigate were, first, the relative value of hydrochloric acid and pepsin and gasterine as aids to digestion in cases in which the stomach secretion was practically suppressed, and, secondly, whether any or all of these remedies produced lasting benefits. If this was not so, whether digestion was aided at all by their administration.

The investigation was restricted, as has been said, to those cases in which repeated investigation showed that the hydrochloric acid and pepsin as well was either greatly diminished or entirely suppressed.

Cases in which there was a decided nervous element, especially instances of the so-called heterochylia, were rejected, since one can never be sure that the achylia in such cases is constant and does not alternate with a gastric secretion that approaches normal.

The technique that the writers employed in their experiments was scientific and thorough. They tested each remedy in succession, and then followed them up on the next day by a test meal without the remedy as a control.

The summary of their results is as follows: They found that no results were obtained with less than 100 c.c. of the gasterine. This was compared with 100 c.c. of a decinormal hydrochloric solution, and also with 100 c.c. of decinormal salt solution and 5 gm. of pepsin. The remedy in each case was given with a test meal, and the meal was removed after a suitable interval and examined for free HCl and combined HCl and pepsin, and by the Biuret test.

The division of the food in the chyle was also considered. They found that the test meal was always better digested after the administration of gasterine, and that the remedy without doubt exerted a favorable influence upon digestion, provided that the necessary amount, 100 to 150 c.c., was given.

Gasterine, however, was no more powerful in its effects than the artificial mixture of hydrochloric acid and pepsin, provided also that it was given in the quantity mentioned. Free hydrochloric acid itself in the absence of pepsin did not influence digestion. However, neither gasterine nor the artificial gastric juice had any lasting effect upon digestion. Their only action was in digesting the meals with which they were given.

The writers think, however, that a general tendency of withholding hydrochloric acid in these cases of achylia is not a good one. Upon the ground of their investigations they think that large doses of pepsin and hydrochloric acid have a most favorable effect upon digestion in these cases of hypochylia and achylia, especially when the appetite is poor and when there is fermentation of the stomach or diarrhœa.

The writers have also investigated the artificial stomach juice made from pigs, which is also a proprietary preparation, and is known as *dyspeptine.* The remedy had been given a trial in Riegel's clinic, but without good results. Further investigation showed that it contained no free hydrochloric acid and little or no pepsin.

Walter Erb[1] has also investigated dyspeptine in a series of clinical investigations. He finds that it is distinctly disappointing in its results. Chemical investigations showed the absence of hydrochloric acid and insignificant amounts of pepsin.

The amount of pepsin that was found necessary to produce results is very much larger than is usually given by American physicians. I suppose that 5 grains of pepsin is considered a fair dose, though Heichelheim and Kramer found that 75 grains was needed to obtain artificial digestion.

Balneology in Gastrointestinal Disease. In spite of the enthusiastic physical and chemical investigations into the action of various mineral waters the old empirical methods still control their administration, and our investigations have merely confirmed scientifically to some extent what had been in the past discovered by experience alone. Even now experiments give very conflicting results, sometimes confirming and at others conflicting with the empirical rules of the various water cures. However, it is beyond dispute that balneotherapy does benefit many forms of gastrointestinal diseases, though precisely how much of the improvement is due to water and how much to the regulation of diet, habits of life, and change of air must be uncertain still. Ewald[2] considers the action of various mineral waters upon gastrointestinal diseases under four headings: First, the indifferent or almost pure waters and the alkaline carbonate waters; second, the alkaline muriatic and chloride of sodium water; third, the alkaline and saline waters and bitter waters (Glauber's salts); fourth, sulphur waters and calcium waters. The indifferent waters are used merely to cleanse the gastrointestinal tract. Taken into a fasting stomach in the morning pure water passes through the tract quickly, removing with it remains of food, mucus, and stomach contents. It will also dilute and carry off the acid stomach contents that collect in the fasting stomach in hypersecretion. Besides its cleansing and diluting action large amounts of pure water washes the blood and decreases any tendency to intoxication with abnormal metabolic products by increasing the daily amount of urine. The action of pure water is the real basis of benefit derived from the use of heated water, the temperature merely influencing the process of absorption. Second, the active principle of the second class of water depends upon carbonate of soda and CO_2 gas. Clinical investigations into the action of such waters show the greatest divergence, ranging from the diminution in HCl to the production of hyperacidity. From this it is clear that the purely chemical power of neutralization possessed by the carbonate of soda is overcome by the physiological activity of the gastric mucous membrane. The explanation for the different results obtained by different investigators lies in the fact that the same dose of soda will produce very different effects when given at different stages of digestion. Thus, as Limossier has shown, a moderate dose of soda given shortly after food is taken will diminish the HCl secretion. Later, such a dose will increase it to its normal, and finally when given near the end of digestion the soda will produce a hyperacidity. This should be borne in mind when ordering alkaline waters, which may thus be used to advantage in hyperacidity as well as in hypoacidity by varying the time of administration. The carbonic acid gas in such carbonated or sparkling waters, in contrast to the action of the soda, has a constant and decidedly stimulating effect upon gastric secretion and thus modifies the action of the soda. Such a carbonated water is quickly absorbed, the gastric secretion under its influence begins earlier and reaches a greater amount, and the motility of the stomach is increased so that it is emptied earlier. Third, the alkaline muriate waters, including pure chloride of sodium water, have certainly a decided effect upon the functions of the gastric mucous membrane. In 1888 Boas showed that hot salt water had a very beneficial effect in increasing gastric secretion, and later confirmed this clinical observation by showing that intravenous injections of salt increased the gastric juice. The latest investigations upon this subject, namely, those by Meinel,[1] have confirmed this work of Boas. Meinel showed that the taking of only 250 c.c. of Weisbaden Kochbrunen or other saline waters, carbonated or not, causes HCl secretion to appear earlier and to reach a greater amount than in his control experiments.

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[1] Münchener med. Wochenschrift, 1904, Bd. li., No. 32.

[2] Berliner klin. Wochenschrift, 1905, Bd. xlii., No. 15.

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[1] Zeitschrift f. Diät. und Physikol. Therapie, September 1, 1904.

Dopper[1] has confirmed Meinel's results and found that the influence of such saline waters were particularly beneficial in the gastric catarrhs produced by alcoholic excess or the abuse of tobacco. It appears quite definitely settled that a course of such a saline waters has not the power of increasing nitrogen elimination that has been claimed for them. This is really not a disadvantage, for it permits the use of these waters in cases in which it is not desirable to have nitrogen loss—as heart disease, obesity, and in debilitated people.

Saline waters are generally supposed to have some power of dissolving mucus and are, therefore, recommended in cases of chronic gastritis. However, Ewald is not sure that the benefit that comes from their use in such cases arises in their power of dissolving mucus. At autopsy the mucus of chronic gastritis is hard and very tightly adherent, and it can be demonstrated outside of the body that such mucus is not dissolved by long soaking in salt solution. But that such cases are often benefited by a course of such waters is undeniable.

The same may be said of hyperacidity in neurasthenia, and also certain cases of acid gastritis without neurosis, with dilated stomachs. These patients ought not to be benefited by saline waters, as usually HCl is increased by their use; but whether it is the manner in which the waters are taken or the general *régime* of the cure, it is certain that such conditions are often decidedly benefited by a course of saline waters.

The *alkaline-saline* waters are known empirically to benefit cases of suppression of HCl secretion except those dependent upon a mucous catarrh or atrophy of the gastric mucosa. The attempts to demonstrate scientifically what the action of these waters is has given very confusing results. It may be that the effect of the waters upon HCl secretion differs at different periods of the case, and probably the diet and discipline of the course of treatment have much to do with the patient's improvement.

The action of waters containing *Glauber's salts*, which include the Carlsbad waters, is not well settled, and their use is governed by empiricism.

Investigation into the aromatic products of putrefaction, especially the ethereal sulphates and fatty acids of the urine, has shown no deviation from the normal, under the influence of such waters.

The observation of Carciani[2] shows that waters containing Glauber's salts have a very considerable power of increasing bile secretion. His experiments were made upon a man with a gall-bladder fistula in which part of the bile came through the fistula and part passed down into the intestine. When the patient drank 1 litre of Montecatini, Carlsbad water, the bile increased from 90 to 100 c.c. to 142 c.c., while its solid substance was proportionately increased.

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[1] Ueber den Einfluss der Koch-salzquellen auf den Stoffwecksel des Menschen, Berlin, 1904.

[2] Riforma Medica, 1902, No. 160.

The *temperature* of the water influences the time of its absorption. Hot water (50° to 55° C.) is very quickly absorbed, and it seems probable that it increases secretion and also the motility of the stomach.

The influence of *baths* upon gastric digestion can only be indirect. If they influence the general condition of the patient for the better the condition of the gastrointestinal tract is also benefited.

Lindemann[1] found that *cold sea baths* had a decided tonic action upon the function of the stomach and intestines. They are contraindicated in most organic diseases of the stomach, especially when the lesion is of an inflammatory character.

The *diet* in the water-cure establishment is a very important part of the treatment, and Ewald protests strongly against the fashion, that seems to be growing in favor, of relaxing the strict rules which have always been in force. It may be entirely true that the drinking of mineral water does not interfere with a liberal diet, but most of the patients at "water cures" live much more freely than is good for them, and the restriction of their diet during the cure is responsible for a very large, if not the largest, part of the benefit they receive.

Ewald closes his article with the statement that all rules for a course of balneotherapy must be suited to the peculiarities of the individual, and are to be determined by the patients' social position, state of nutrition, habits of life, etc. Some are benefited by a liberal *régime* and some must be restricted. We can determine into which class each patient falls only by experience.

Occult Blood in the Feces as a Symptom of Gastric Disease. The clinical significance of occult blood and the technique of its detection were considered in PROGRESSIVE MEDICINE for December, 1904 (p. 24). In the year that has elapsed many series of observations have been reported and the methods of detection have been elaborated. There have been papers by Joachim,[2] Schloss,[3] Koziczkowsky,[4] Petrachi,[5] Steele,[6] Steele and Butt,[7] Clemm,[8] and Ledeschi.[9]

I have personally had considerable experience with the test and am convinced that the presence of occult bleeding from the gastrointestinal canal is a symptom of much importance provided various sources of error can be eliminated. What these conditions are can be told perhaps as well as in any other way by quoting conclusions from my own paper.

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[1] Deutsche med. Zeitung, 1897, No. 26.

[2] Berliner klin. Wochenschrift, 1904, Bd. xli., No. 15.

[3] Archiv f. Verdauungskrankheiten, 1904, Bd. x.

[4] Deutsche med. Wochenschrift, 1904, Bd. xxx., No. 33.

[5] Zeitschrift f. klin. Medizin, 1905, Bd. lvi.

[6] Pennsylvania State Medical Journal, February, 1905.

[7] American Journal of the Medical Sciences, July, 1905.

[8] Archiv f. Verdauungskrankheiten, 1904, Bd. x., No. 4.

[9] Gazetta degli ospedali, January 22, 1905.

During the past winter I have examined 720 stools for occult blood from 100 patients in the wards of the Presbyterian Hospital. Besides this I have made several series of observations upon the stools of normal individuals to determine the effect of food and iron upon the test.

Occult bleeding has in general the same clinical significance as visible hemorrhage, except that its recognition is a much more delicate means of diagnosis because the quantity of blood present is so small.

Practically, however, the presence of occult blood is of decided diagnostic value chiefly in the detection of gastric or duodenal ulcer or gastrointestinal cancer, because it occurs with considerably more regularity and frequency in these two affections than in any other condition of the alimentary tract.

The subject has been developed particularly along these lines, and most of the work done so far has been directed by the desire of obtaining a new and useful aid in the detection of ulcer and cancer. The value of the sign depends, of course, upon the care with which various sources of error are eliminated.

On the other hand, the absence of occult blood is of equal and perhaps greater value in diagnosis than its presence. Here there is no element of possible error, and if blood is not found after a series of examinations in any case, then cancer and ulcer can be excluded.

The presence of occult blood will be of value in the diagnosis of carcinoma and gastric ulcer only when sources of bleeding that have no significance are excluded. Since the test is very sensitive, very small amounts of blood can be detected, and naturally the liability to error in determining the origin of the hemorrhage must be greater than in large and visible hemorrhages where the condition of the blood may indicate whether it comes from high up or low down in the gastrointestinal tract. Thus, as has been said, various foodstuffs containing hæmoglobin, if present in large enough amounts, will give the reaction, and blood in the stools may occur after epistaxis, hæmoptysis, and in cases of hemorrhoids. Consequently, an important part of the study of occult blood should consist of experiments to determine in what conditions the reaction may occur without significance in the diagnosis.

The sources of error in the correct interpretation of the presence of occult blood in the stools in the diagnosis of cancer and gastric ulcer arise in the difficulty of excluding all other sources of small hemorrhages. These are many in number and variety. It is usually possible to exclude the conditions that would produce such uncertainty, and it is often worth while to go to considerable trouble to do so, as in the use of the proctoscope, etc. Tuberculous ulcer, typhoid fever, hemorrhoids, fissure, or purpura can usually be excluded with more or less certainty.

On the other hand, it will often be impossible to eliminate conditions that might give rise to error, and sometimes one cannot be certain whether the blood comes from a gastric ulcer or gastrointestinal cancer, or is a symptom of some other affection that it will be impossible, at the time, to exclude. An example of the last condition is cirrhosis of the liver, of which my list contained two cases, both with blood in the stools. One of these was a perfectly typical case in the advanced stage, with small liver, large spleen, and ascites, and I was never at a loss to explain the blood, which probably came from the œsophageal plexus. In the other case operation disclosed duodenal ulcer and in addition cirrhosis of the liver. The symptoms were fairly typical of ulcer, namely, hyperacidity, anæmia, rather indefinite epigastric pain, and occult blood in the stools. There was no jaundice, ascites, hemorrhoids, or other decided signs of portal obstruction. We found, however, a typical small, rough, cirrhotic liver with exceptionally good collateral circulation through the deep veins of the abdominal wall, which explained the absence of indications of portal obstruction. I was impressed by the fact that all of the symptoms could have been produced by the cirrhosis alone without the ulcer, including the occult bleeding, and am inclined to think that cirrhosis of the liver will be one of the conditions most liable to cause error in the interpretation of occult bleeding, because it so often exists without symptoms, or with very indefinite symptoms of gastrointestinal disorder, and, besides, shows occult bleeding in the stool quite regularly and frequently.

I have arranged a table of the conditions which might give rise to confusion, appreciating the fact that the list is incomplete, but give it because it represents my own experience and conclusions.

Extraneous: Red meats, carmine, swallowed blood from any cause, hæmoptysis, epistaxis, and menstruation.

Arising from gastrointestinal tract: Cirrhosis of liver, purpura of gastrointestinal tract, tuberculous ulcer, typhoid ulcer, hæmophilia, hemorrhoids, and fissure and fistula of rectum.

In my experience the aloin reaction has proved the more reliable and less liable to be obscured by urobilin in the ethereal extract, and I therefore think that it is the more dependable test. However, the guaiac reaction has given very satisfactory results; indeed, almost as satisfactory as the aloin. I employed both tests upon every stool and seldom found one positive without the other, but never considered that blood was present unless a clear reaction with aloin was obtained.

All observers, from Boas to Koziczkowsky, recommend the aloin test as the more reliable and delicate. It has the advantage that it is not as much obscured by bile pigments or chlorophyll in the ethereal extract, and, as has been said, it is extremely delicate. Koziczkowsky experimentally found that the reaction demonstrated 0.25 gm. of blood in 2 gm. of feces.

He has noticed that the liability to error in the color reaction due to the presence of considerable urobilin or chlorophyll in the ethereal extract is much increased by artificial light, and says that the test should always be done in daylight.

He also found that carmine in the stool gave a red color in the reaction almost exactly like the color of the blood reaction. Consequently charcoal should be used instead of carmine to mark a test diet if this is employed.

I found in my work in the wards that pressed beef-juice—namely, the juice from rare beef—gave a strong positive reaction, invariably within twenty-four hours of the ingestion.

Therefore, before a positive test can be considered of any value, red meats and beef-juice should be cut out of the patient's diet for at least twenty-four hours before the tests are made. It would probably be safer to give a still longer interval or to mark off the meat-free diet with charcoal and not to make the test until the charcoal appears in the stool.

The test for occult blood must often be made while the patient is upon rectal feeding. Meat extracts occasionally are used in nutritive enemata, and we have shown that some of these meat preparations will give the reaction for occult blood. Therefore, when the stools contain portions of these enemata, the particular beef extract employed should be tested to see whether or not it gives the reaction for blood.

The question as to whether various preparations of iron taken by the mouth will give a reaction in the stools similar to that of blood is an important question, since iron will be very often given in gastric ulcer or other anæmic conditions while the stools are being tested. I have examined the stools of patients who were taking various iron preparations by the mouth. The forms of iron employed were ferric carbonate, 30 grains a day; Blaud's pill, 30 grains a day; ovoferrin, 1½ ounces daily; peptomangan, 1½ ounces daily. These preparations were taken for at least one week, and never during their administration did I obtain a reaction similar to that of blood in the stools.

I think that these results apply equally well to all other preparations of iron, since the iron in the stools usually has been changed into a sulphide by the time it reaches the rectum, and the stools tested were always greenish-black.

The ingestion of iron need not be considered in examining the stools for occult blood.

Pus in the Feces. A suggestion has been made based upon the work of Brandenburg, who found a nucleoalbumin in pus capable of giving a blue reaction with guaiac, that pus in the stools might be a source of error in the detection of occult blood. I am inclined to think that this objection is not well founded because the blood tests are made with an ethereal extract, made after the feces have been mixed with acetic acid, which should precipitate this nucleoalbumin that causes the reaction similar to that of blood.

It is hard to demonstrate experimentally that pus will not give the test, because it is difficult to obtain pus which is perfectly free from blood. I have tested three specimens of urine containing much pus, and three specimens of pus which were obtained in such a way that they contained very few blood cells, as demonstrated by the microscope with the following result: An acetic acid ethereal extract of pure pus from the urine does not give the reaction for blood. A specimen of pus containing a very small amount of blood gave only a very slight reaction by the aloin and guaiac tests, which might be explained by the red blood cells present. However, if the substance responsible for the reaction was derived from the leukocytes of the blood and not from the hæmoglobin, then with pus the reaction should have been very intense indeed, which was not the case.

Weber, in his original article upon the detection of blood in the stools, found that the spectrum analysis of an acetic acid ethereal extract of feces containing blood showed hæmatin; consequently, it is reasonable to suppose that the substance in the acetic acid ethereal extract which gives a reaction for blood is derived from the hæmoglobin, which has been changed by digestion into hæmatin.

All of the preceding indicates that if the feces are thoroughly mixed with acetic acid before the ethereal extract is used, pus will not be a source of error in the detection of occult blood.

Classification of Diseases in Relation to Occult Blood in the Feces. *Positive Reaction.* Cancer of the gastrointestinal tract; gastric and duodenal ulcer; benign pyloric stenosis with stagnation; cirrhosis of liver; purpura; tuberculous enteritis, typhoid fever (infrequently). *Negative. Gastrointestinal diseases.* Gastric neurosis with anacidity, subacidity, hyperacidity, heterochylia, or normal secretion; chronic constipation; mucous colitis, cholecystitis, and hyperacidity; achylia gastrica; chronic gastritis, with anacidity or normal acidity. *Negative. Miscellaneous diseases.* Pernicious anæmia; severe anæmia secondary to malnutrition; phthisis pulmonalis; ulcerative endocarditis; pneumonia; influenza; acute mania; diabetes mellitus, herpes zoster.

Carcinoma of the Stomach. Hyperacidity in Gastric Carcinoma. Statistics show that free HCl is present in the stomach contents in 10 to

13 per cent. of all cases of cancer of the stomach. This free acid, when present, is usually diminished in amount, though occasionally it may be normal or even increased.

Hyperacidity in the course of gastric carcinoma is generally considered to be always due to one of two causes: either a cancer develops upon the floor of an ulcer, or, according to Richter, the hyperacidity may be a part of the general neurotic disposition and may persist during the development of the carcinoma.

Ziegler,[1] however, reports a series of cases apparently of a new type. Here decided hyperacidity is present in the early stages without neurasthenia or ulcer, as was demonstrated by operation or autopsy.

In the first stage there are the typical symptoms of hyperacidity, coming on suddenly in an individual who has been apparently in perfect health. Motility is good, there is an hyperacidity of from 58 to 80 for free HCl and 90 to 120 for the total acidity. The blood is normal and there is no loss of weight.

The picture is that of a typical hyperacidity of functional origin, except that the condition is extremely resistant to the remedies that usually afford relief. In single cases there may be even in the first stage a peculiar aversion to meat and constant pain without reference to the contents of the stomach.

In the second stage the acid may be still increased or it may fall to normal or below. Motility is impaired and the production of mucus is increased. The patient's general condition is no longer good, anæmia develops, the tongue is coated, and the pain is constant and aggravated by food. There may be lactic acid and Oppler-Boas bacilli.

In the third stage the picture is that of a typical gastric carcinoma.

In the first and second stages a diagnosis is often impossible and is at all times difficult. However, Ziegler directs attention to the following points of difference between functional hyperacidity and cancer with hyperacidity:

1. Silver nitrate, atropine, bismuth, and the alkalies cause only temporary improvement.

2. There is a peculiar aversion to meat, and the appetite is poor.

3. There is often anæmia of a grade unusual in functional hyperacidity.

4. Advanced age is against functional hyperacidity.

5. The development of gastritis and the disturbance of motility should always, in a case of functional hyperacidity, be considered extremely suspicious.

Ziegler does not pretend to explain the excessive formation of acid, but gives it as his opinion that the cancer is primary and the hyperacidity directly dependent upon it. It is of interest in this connection that Ziegler himself makes the statement that hyperacidity is more frequent in Karlsruhe than in other parts of Germany, probably on account of the albuminous diet of the inhabitants, who consume large amounts of proteids, coffee, and white wine, and relatively small amounts of fat. It is significant that these cases of hyperacidity in cancer all occurred in the St. Vicentius Hospital in Karlsruhe.

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[1] Zeitschrift f. klin. Med., 1904, Bd. liii.

Honigman[1] reports a case of hyperacidity and carcinoma of a somewhat different type and with a very peculiar course.

The patient had suffered for many years with functional hyperacidity and hypersecretion, apparently due to a neurosis. There was some atony as well. The patient had improved under treatment and had gained some weight. Suddenly after a slight hemorrhage the whole clinical aspect of the case changed. The motor power of the stomach failed entirely, the hyperacidity and hypersecretion gave way to an anacidity and an achylia, and the patient began to lose flesh and strength. At the same time attacks of tetany made their appearance. The condition of the patient became so serious that an exploratory operation was undertaken, and upon opening the abdomen a pyloric cancer was found with many miliary metastases in the mesentery. A gastroenterostomy was done and the abdomen was closed. The attacks of tetany ceased, but the patient rapidly lost flesh and died in ten weeks. The sudden change in the patient's condition was probably due to the breaking of the growth into a small bloodvessel, thus causing a hemorrhage and metastasis and the conversion of a local process into a general one. At the autopsy a non-ulcerated carcinoma of the pylorus was discovered which had narrowed but had not closed the pylorus. The stomach was much dilated.

The case is of interest on account of the sudden change from hyperacidity to anacidity, and the sudden onset of serious symptoms. It suggests that the intoxication by the specific toxin of cancer has more to do with the anacidity than any secretion from an ulceratory tumor, since this tumor was not ulcerated and the change was so sudden.[2] The breaking of the cancer into a vessel and the general metastasis would of course greatly increase the production of the specific cancer poison.

THE PRESENCE OF LONG, THREAD-LIKE BACILLI IN BLOOD CLOTS IN THE STOMACH CONTENTS, AND THEIR SIGNIFICANCE IN THE EARLY DIAGNOSIS OF CARCINOMA OF THE STOMACH. Heichelheim,[3] writing from Riegel's clinic, says that the long, thread-like bacillus known as the

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[1] Zeitschrift f. klin. Medizin, 1904, Bd. liii.

[2] PROGRESSIVE MEDICINE, December, 1903, p. 30.

[3] Zeitschrift f. klin. Medizin, Bd. liii.

Oppler-Boas bacillus can be found most readily in the dark-brown blood clots that are often found in the stomach contents of cases of carcinoma. In his experience these clots were present in 97 per cent. of a series of 43 cases that he analyzed. He distinguishes between the darker clots in which the microscope shows very few unaltered red blood cells and the fresh red clots with unchanged corpuscles. The former comes from the stomach, the latter probably from the pharynx, nose, or œsophagus, and are due to the passage of the tube.

The presence of large, or even moderate, numbers of the bacilli with these clots after a test breakfast which shows no free HCl is greatly in favor of carcinoma, while the finding of single bacilli in the clots also favors carcinoma, but not so strongly.

His conclusions are based upon the study of 43 cases, in 20 of which gastric carcinoma was demonstrated by operation or autopsy. In all the cases of cancer there was disturbance of motility and lactic acid was demonstrated in the gastric contents comparatively early in the disease. Dark-brown blood clots were found in all but 3 per cent., and bacilli were present in every case. The remaining 23 patients were cases of anacidity of various causes with good motility. Their stomach contents contained no clots and only occasionally a single bacillus.

The explanation for the presence of bacilli in the blood clots may be found in the fact that the cultivation of these bacilli is most successful when a few drops of blood is added to the culture medium. Heichelheim goes farther and suggests that there may be something in the blood from a cancer that specially favors the growth of these bacilli, and that is why they are found in the clots from carcinomatous ulcers and not in those from simple ulcers.

A very interesting and important part of his investigation was that which showed the presence of bacilli in the clots in the stomach contents of six cases of carcinomatous ulcers, in which there was also hyperacidity. The bacilli were not numerous and not always easy to find.

The presence of the bacilli in contents in which there was an excess of HCl and absence of lactic acid is against the usually received idea that these bacilli grow only in lactic acid. If Heichelheim is right their presence is much more significant of cancer than has been supposed. As was said in Progressive Medicine of last year (December, p. 48), there has been a general idea that the presence of Oppler-Boas bacilli had about the same diagnostic value as the presence of lactic acid.

Heichelheim thinks that it is probable that the bacilli are protected from the free HCl by the blood clots and by the deepness of the fissures in carcinomatous ulcer. The stomach juice cannot penetrate as deeply into the crevices of an ulcer with edges and floor infiltrated by cancer as it can into a simple peptic ulcer whose walls are not infiltrated. Consequently, the bacilli are not affected by the excess of HCl in carcinomatous ulcer and are found in the blood clots covering the carcinomatous ulcers.

In a series of 50 stomach contents containing clots from various diseases, including cases of chronic gastric ulcer, the bacilli were absent, or present in such small numbers as to be disregarded. This, of course, suggests that the growth of the bacilli is dependent upon some specific characteristic of cancer and not upon the presence of lactic acid, as has formerly been supposed. Future investigation is needed.

FLAGELLATE PROTOZOA IN THE HUMAN DIGESTIVE TRACT. The papers of Cohnheim,[1] Zabel,[2] and Rosenfeld[3] indicate that the presence of some forms of protozoa may be a symptom of carcinoma of the cardiac end of the stomach and lesser curvature without pyloric obstruction or of the lower end of the œsophagus. These protozoa are usually flagellate and the trichomonas intestinalis is the organism oftenest found. The three observers mentioned have found trichomonas with much regularity and for a period of some months at a time in 12 cases of carcinoma. Only once in a case reported by Rosenfeld were they found in a non-carcinomatous patient and then only twice. The flagellates are commonest when there is complete achylia and are easiest found in the neutral or slightly alkaline contents removed from the fasting stomach. Once, Rosenfeld found them in the stomach contents containing a good amount of HCl, but they never occurred in the lactic acid contents of pyloric carcinoma. The number of observations are as yet too small to say definitely whether the presence of trichomonastodes is constant enough in the forms of gastric carcinoma which are not accompanied by retention to be of diagnostic value.

The trichomonastodes certainly have no pathological significance in the stomach, and the same may be said of their connection with the so-called flagellate diarrhœas. It has never been proven that they have any power of producing local disease of the intestines and their presence in the stools during the inflammatory condition of the intestine is almost certainly of no significance and the cause of the diarrhœa must be sought in some other condition. Rosenfeld gives several examples of this in which the intestinal disturbance was produced by enteritis after dysentery, tapeworm, ascaris disease, intestinal polyp, etc. The flagellate protozoa were present in every case, but evidently had no causal relation with the intestinal symptoms.

GASTRIC COLIC FISTULA. G. Sandberg[4] describes a case of carcinomatous gastrocolic fistula with some unusual features. The patient was a man aged forty-four years, who in March, 1903, began to vomit blood and to suffer with epigastric pain. In March, 1904, an indefinite tumor mass developed under the left border of the ribs. Lavage showed much retention over night, no free HCl or lactic acid, and the presence of long bacilli. In April the same year he began to vomit masses of fecal matter. For the next two months the patient would have this fecal vomiting combined with the passage of fecal stools and then suddenly would develop a lientery in which directly after eating he would pass stools consisting of stomach contents containing lactic acid, long bacilli, and unchanged muscle fibre. During the period of lientery he was free from pain, but just before the return of fecal vomiting he suffered greatly from abdominal cramp. Peristalsis of the stomach was very discernible through the abdominal wall. A diagnosis of gastrocolic fistula was made chiefly because the distance from the mouth to the rectum appeared to be so short. In one hour after ingestion the food was in the stool. When various kinds of meat were taken they could be recognized in the stool. The stomach was not inflated because of the great pain. At autopsy the stomach was found to be adherent to the transverse, ascending and descending colon. The cancer mass was at the cardia extending from the œsophagus down to the greater curvature. There was an opening from the stomach into the splenic flexure of the colon. As a result of the adhesions between the splenic flexure and the greater curvature, the lumen of the transverse colon was decidedly obstructed just in front of the splenic flexure, and the transverse and ascending colon behind the stricture was considerably dilated.

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[1] Deutsche med. Wochenschrift, 1903, Bd. xxix., No. 12.

[2] Wiener klin. Wochenschrift, 1904, Bd. xvii., No. 38.

[3] Deutsche med. Wochenschrift, 1904, Bd. xxx., No. 47.

[4] Zeitschrift f. klin. Medizin, Bd. lvi., parts i. and ii., p. 13.

The sudden change from lientery to fecal vomiting and fecal stools is not a common symptom of gastrocolic fistula. Indeed, there does not seem to be any case reported of a similar nature. The following is probably the explanation: Sometimes the greater part of the food went directly by the shortest route from the stomach to the bowel and was passed by the ascending colon into the rectum. During this period there was lientery and discharge of gastric contents through the rectum. The quick discharge of stomach contents prevented vomiting. During the period of lientery the pylorus was still patulous and a certain amount of food would pass along the normal channel. This passed down, became fecal matter, and collected in the dilated portion of the colon in front of the narrowing at the splenic flexure, causing the dilatation and producing the cramp-like pain. Finally, when enough feces had collected it forced its way through the stricture: part of it went into the stomach and was vomited, and a part of it passed down and formed the fecal stool. It is very unlikely that there was any true reversed peristalsis.

Gastric Ulcer. INCIDENCE OF GASTRIC ULCER IN AMERICA. The pathological data collected by Howard[1] show that gastric ulcer is less frequent in America than in London or upon the Continent, and that it is more common in the northeastern than in the more southern regions of America, with the exception of San Francisco. His autopsy figures are as follows:

San Francisco	2.35
Boston	1.84
New York	1.42
Philadelphia	1.21
Montreal	1.04
Cleveland	0.92
Baltimore	0.85
Average	0.32
London	4.6
Europe	8.5

Howard as well as Brooks calls attention to the fact that pathological data do not give a true idea as to the frequency of gastric ulcer.

Open ulcers are often overlooked, since they are small and are not surrounded by areas of inflammation. Small superficial scars must frequently be missed at autopsy and there may be scars not due to ulcer.

With the idea of determining the clinical incidence of ulcer, Howard collected a total of 930 cases diagnosticated as gastric ulcer from a total of 161,599 admissions to fifteen different hospitals in the United States and Canada.

He found that the clinical figures corresponded closely to the pathological, and that clinically, as well as pathologically, ulcer is more frequent in the northeast and is less frequent in America than abroad. The clinical figures are as follows:

Boston	1.28
Montreal	0.92
New York	0.44
Cleveland	0.38
Baltimore	0.37
Philadelphia	0.16
Chicago	0.15
Denver	0.12
Average	0.57
London	0.78
Berlin	1.33
Edinburgh	2.02

Francine[2] has analyzed the records of the Philadelphia General Hospital, which were not included in Howard's list.

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[1] Medical News, October 8, 1904.

[2] American Journal of the Medical Sciences, March, 1905.

From January 1, 1893, to December 31, 1902, a period of ten years, there were roundly 40,000 admissions. Among these there were 42 gastric and 2 duodenal ulcers. When these figures are combined with those of Howard the clinical incidence of gastric ulcer in Philadelphia amounts to 0.15 per cent.

THE PATHOLOGICAL ANATOMY OF GASTRIC ULCER. Brooks[1] has analyzed 1000 consecutive autopsies in the Bellevue Hospital records, most of which were made by himself personally. He is much impressed by the fact that gastric ulcer appears to be much less frequent than he had supposed. Among these 1000 autopsies but 9 cases of gastric ulcer were found. Of 9 cases but 2 had been diagnosticated during life—a fact which also caused him much surprise, since all of these patients had been under the care of some of the best clinicians in New York.

In every fatal case in which a diagnosis of ulcer was made an ulcer was found at autopsy. This tends to show that our methods of detection of the milder grades of ulcer are imperfect, although it is fairly easy to diagnose the more severe forms.

It seems probable that a good proportion of gastric ulcers, perhaps one-half, are not recognized clinically.

Approaching the subject from its clinical side, Brooks found in 1366 consecutive cases gastric ulcer was diagnosticated in but 3. These observations force us to the conclusion that gastric ulcer is a rather rare disease, at least in a general hospital service.

In the Bellevue list, as a rule, the ulcers were single, but they were often multiple.

Brooks mentions a case belonging to Dr. Lusk in which gastric ulcer had been diagnosticated and operated upon before perforation was complete. The patient did well for several weeks, but died suddenly, evidently from peritonitis due to perforation. At autopsy a perforated ulcer of very recent formation was found some distance from the first point of the disease, and which had evidently formed since the operation. In Brooks' experience usually the ulcer has been found near the pylorus.

As a rule, the size of the acute ulcer in his list did not exceed that of a twenty-five-cent piece, and the size of the average ulcer was even smaller than a five-cent piece, which Einhorn mentions as the usual minimum size. He is convinced that small ulcers are the rule, but says that a matter of size is of relatively little importance, since the size varies very much as to whether the stomach is dilated or contracted.

There is no doubt but that a large number of small gastric ulcers heal without producing symptoms sufficiently marked to cause the patient to consult a physician. In these cases the ulceration probably does not extend deeper than the submucosa, which heals by granulations springing up from the floor of the ulcer and producing a very small stellate scar. Brooks is inclined to think that there is never any glandular hyperplasia in such a process of healing, and he is inclined to think that many of the small white points of thickening which are often found postmortem in the mucous membrane of the stomach are really minute healed gastric ulcers. We are not justified in thinking, however, that all scars of the mucous membrane represent gastric ulcers, for many of them probably are simple scars formed after injuries of gastric mucosa or some kindred cause.

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[1] Medical News, October 8, 1904

Brooks is strongly of the opinion that primary gastric cancer frequently arises in these healing gastric ulcers. He refers to 2 cases of this condition. Howard, on the other hand, believes that ulcus carcinomatosum is rare. The Johns Hopkins series contained only 4.8 per cent.

ETIOLOGY OF GASTRIC ULCER. *Chlorosis and Anæmia.* Wirsing[1] found very pronounced blood changes in all his cases. They were usually of the type of chlorosis and did not include cases of anæmia secondary to hemorrhage. It is very hard to demonstrate the part that anæmia plays in the etiology of ulcer, but in 57 of 190 cases there was a clear history of chlorosis for some time before the onset of gastric symptoms, indicating that the blood condition may have been a causal factor.

Howard,[2] in his analysis of 82 cases of gastric ulcer from the records of the Johns Hopkins Hospital, found that the hæmoglobin averaged 58 per cent, the red cells 4,071,000, and the white cells 7500. There was no material change in the number of white cells, and the Johns Hopkins Hospital experience with digestion leukocytosis was too limited to be conclusive, but in the cases in which such observations were made the increase in leukocytes after digestion was too slight to be of much value in the differential diagnosis.

Influence of Pressure and Trauma. Ackerman[3] reports 12 cases of gastric ulcer in which the patient's occupation was of such a character that constant pressure was exerted upon the epigastrium. He also reports 1 case where a blow from the kick of a horse upon the epigastrium was followed in eighteen months by a gastric ulcer.

It is difficult to connect such physical conditions with the causation of gastric ulcer. Theoretically the interference with the circulation of the stomach due to pressure or insults to the mucous membrane from trauma would seem to favor the development of ulcer. Still, all shoemakers do not have ulcers, and we cannot regard either pressure or trauma as exclusive causes.

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[1] Archiv. für Verdauungskrankheiten, 1905, Band xi., Heft 3.

[2] American Journal of the Medical Sciences, December, 1904.

[3] Medical News, January 14, 1905.

Menstruation. It has been noted by several observers that gastric ulcers are unfavorably affected by the occurrence of the menstrual periods.

Wirsing has observed that a great many cases are admitted to the hospital during menstruation inferring an exacerbation of the symptoms and especially of pain during that time.

Pariser[1] orders his patients to stay in bed and upon liquid diet during each period for several months after an ulcer cure. Free gastric hemorrhage is often followed by cessation of menstruation.

Occasionally hæmatemesis seems to recur at the menstrual period, as observed by Kuttner in Ewald's clinic.

Wirsing cites an interesting case which had had typical symptoms of ulcer for three years with severe hæmatemesis and which had been treated in many hospitals without relief. She became pregnant and immediately all gastric symptoms left her and she has remained well ever since.

Influence of the Climacteric upon Ulcer. Borri[2] says that ulcer is frequent at the menopause, although there is nothing in literature to support his statement.

He reports 12 cases from Cohnheim's Polyclinic in Berlin, in all of which symptoms of ulcer began with cessation of menstruation. There may be some connection between the onset of gastric ulcer at this time and the circulatory disturbance of the climacteric.

Gastroptosis. It has been suggested that downward displacement of the stomach might be a predisposing cause for ulcer, for two reasons: first, interference with gastric circulation, and, second, because gastroptosis was formerly thought to be a cause of chlorosis.

This last idea is now discredited, for downward displacement and chlorosis almost certainly have no causal relation. It is possible that the disturbance of circulation that must always follow gastroptosis may favor the development of ulcer. Wirsing found this condition of the stomach in 25 or 8 per cent. of his 316 female cases of ulcer and probably the percentage was higher, as in cases of recent hemorrhage the stomach could not be examined by inflation.

I do not think that these figures are conclusive, for it has been my experience that, leaving ulcer out of the question, there would be at least 8 per cent. of cases of gastroptosis in any collection of women of the class from which Wirsing's patients were drawn (young household servants). The effect of gastroptosis upon the prognosis of ulcer appears much more definite. Thus, in Wirsing's 25 cases of downward displacement only 13 were cured, and of 8 heard from after three years only 2 remained well—a considerably worse outcome than in uncomplicated cases.

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[1] Discuss. Verhandlungen des Kongress f. inn. Med., 1902, p. 112.

[2] Zentralblatt f. innere Medizin, 1904, No. 27.

Valvular Heart Disease in Wirsing's experience did not appear to favor the development of ulcer or to hinder its recovery.

The Administration of Salicylic Acid has been held responsible for the development of gastric ulcer. Wirsing's list shows only 8 cases that took this drug and no connection could be traced between its use and the ulcer.

Syphilis did not appear as a cause of ulcer in any of Wirsing's cases, and specific disease was not more frequent than in other conditions. He refers to 2 cases with fatal hæmatemesis which was caused by syphilis of the liver—a condition which is important in its bearing upon diagnosis.

THE COURSE OF GASTRIC ULCER. In Wirsing's list the average duration of favorable cases was six months. A certain proportion of unfavorable cases ran a course of from one to five years.

He found that those patients who presented themselves for treatment early in the course of the disease had a much better chance of recovery. Thus, the average duration of the condition before treatment was instituted was one and one-half years in the cured cases and two and one-half years in those who were not improved.

THE GASTRIC CONTENTS IN ULCER. Contrary to the accepted rule of past years, that hyperacidity is an important sign of ulcer, Wirsing found that in more than half of 116 cases the amount of HCl was normal.

Ewald,[1] in a series of 132 cases, found even a smaller proportion of cases with hyperacidity.

Howard,[2] in 54 cases, found a greater percentage of cases with diminution of free HCl than either of the two preceding series.

The figures are as follows:

	Ewald.	Wirsing.	Howard
Subacidity, under 30 . . .	9.0%	1.8%	26.4%
Normal acidity, 30 to 60 . . .	56.8%	55.5%	26.4%
Hyperacidity, over 60 . . .	34.1%	42.7%	17.6%

Free acid was absent in 1 case of Howard's series.

If these observations are confirmed then hyperacidity loses much of its value as a diagnostic sign of ulcer. On the other hand, the presence of hypoacidity is a pretty sure indication that ulcer is not present.

It must be remembered that the Ewald test meal is a very mild stimulant to the gastric secretion, and under the influence of other foods the acid may increase to the point of hyperacidity. Several examinations with both the Ewald and Riegel meal should be made before hyperacidity is excluded.

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[1] Verhandlungen des Kongress f. innere Medizin, 1902, No. 35.

[2] Loc. cit.

The influence of an excess of acid upon the healing of the ulcer is interesting and important.

Wirsing put a series of ulcer cases upon the Lenhartz cure,[1] which is intended to neutralize the excess of acid and improve the nutrition. He found that the percentage of acid upon admission and discharge did not differ greatly (on an average only 8 points), but in those cases in which the acidity was not at all or only slightly diminished by the treatment, the proportion of cases was smaller and relapses were more frequent.

FEVER. In 58 of Wirsing's cases, or about half of those who had had recent hemorrhages, slight fever occurred for two to eight days after the vomiting of blood. No reason can be assigned for this phenomenon.

PAIN IN GASTRIC ULCER. The most constant symptom was pain within an hour after taking food. This was present in from 80 to 90 per cent. of all cases. Tenderness was noticed in 80 per cent., or 285 cases. The painful point was in the angle between the ensiform and the left border of the ribs in most of the cases (84 per cent.). It was further toward the left in 9 per cent., to the right in 4 per cent., and under the navel in 3 per cent. of cases.

The position of the pain in its relation to the position of the stomach is very interesting. In 8 cases of low-seated tenderness there were 5 instances of decided gastroptosis, while in the other 20 cases of gastroptosis a change in the position of the pain was not noted. That is, in downward displacement of the lesser curvature the pain of ulcer was localized, not where the upper border of the stomach was, but where it ought to have been. This observation is explained by Roux, by assuming that the pain is referred not to the seat of the ulcer, but to what he calls the point epigastrique in the solar plexus.

The painful points in the back were present in almost half of Wirsing's cases.

Pain when lying upon the side was noted in 121 cases (about one-third), on the left side oftener than upon the right.

DIFFERENTIAL DIAGNOSIS OF ULCER. It is often quite impossible to distinguish an ulcer from the different forms of gastralgia of nervous origin, especially when the latter condition is associated, as it often is, with hyperacidity. The diagnosis is complicated by the fact that such functional disturbances are not infrequently followed by the development of true ulcer.

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[1] PROGRESSIVE MEDICINE, December, 1904, p. 30.

Since sudden and unlooked-for hemorrhage and perforation are the dangers of such uncertain cases it is safest to put all doubtful cases upon an ulcer cure, which is as good treatment for one as for the other.

Wirsing's list included 4 cases of reflex or toxic gastralgias which were admitted with the diagnosis of ulcer and showed all the cardinal symptoms except hemorrhage, but which promptly recovered after the removal of a tape-worm.

OTHER CONDITIONS GIVING RISE TO GASTRIC HEMORRHAGE. *Malaria.* Scozzari[1] reports the case of a civil engineer from a malarious region who had very frequent hemorrhages from the stomach and intestines during his malarial attacks.

Influenza. Hubermann[2] records a fatal gastric hemorrhage during an attack of influenza, in which autopsy showed an acute inflammation of the gastric mucous membrane with erosions, but without a true gastric ulcer.

LEFT-SIDED STOMACH PAIN A SIGN OF GASTRIC ULCER. Riedel[3] lays great stress upon left-sided stomach pain as a sign of organic gastric disease, especially ulcer.

The reason of the left-sided position of the pain is that almost all ulcers are situated in the portion of the stomach that lies to the left of the median line. Only the pylorus lies to the right and the antrum pylori is directly in the middle.

Ulcers in the last-mentioned portions of the stomach would give rise to pain and tenderness to the right or in the median line and are exceedingly hard to differentiate from cholecystitis. If the ulcer has produced pyloric obstruction and secondary dilatation, or if there is pronounced enlargement of the gall-bladder, the diagnosis is comparatively easy, but unfortunately these conditions are presented only in a certain part of the cases.

Pain from a centrally situated ulcer might be confused with referred pain in appendicitis or hernia of the linea alba.

Thus it will be seen that a reflex pain and pain referred to the stomach from lesions of other organs are almost invariably right-sided. Organic disease (especially ulcer) of the pylorus and antrum will also give right-sided or median pain, but these two portions of the stomach are not as frequently affected as the lesser curvature and the stomach wall adjacent to it. All of this portion of the organ lies to the left.

Left-sided Tumor in Gastric Ulcer. Another condition that sometimes helps to bring the pain farther to the left than its real position would indicate is the tendency for ulcers to adhere to neighboring structures, especially the parietal wall, liver, and pancreas, and to be drawn farther to the left by the contractions of the adhesions. This gravitation toward the left is helped by the formation of tumors which arise around the ulcers and their adhesions.

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[1] Gazetta degli ospedali, 1905, vol. xxiv., No. 145.

[2] Chirurgia, 1904, vol. xv., No. 87.

[3] Munchener med. Wochenschrift, 1905, Bd. lii., No. 17.

These tumors are of different sizes and are very apt to come when the ulcer penetrates through the mucous membrane and muscularis and reaches the serosa. They may be formed by true changes in the stomach wall, or because the floor of the ulcer becomes adherent to some neighboring organ. The latter is by far the most common method of origin. Still, Riedel has seen four cases of large walnut-shaped tumors which were produced by thickening in the muscularis and serosa in the neighborhood of an ulcer. This tendency to tumor formation through changes in the stomach wall is least common in pyloric ulcer, so that a tumor to the right is rare. The ulcers of the lesser curvature and of the anterior and posterior abdominal wall to the left of the median line have a much greater tendency toward tumor formation.

The ulcers of the posterior wall very often adhere to the pancreas and those of the anterior wall to the left lobe of the liver.

When the left lobe of the liver becomes adherent to an ulcer of the anterior wall the spread of the inflammatory process produces a perihepatitis which involves the parietal wall and the rectus muscle on the left side. Then the ulcer is drawn over toward the left costal margin and a clearly defined and easily palpated tumor is formed which is not affected by respiration. The tumors formed by the growing fast of the ulcer to the posterior and middle stomach wall oftener sink far to the left of the median line. They may be confused with carcinoma of the pylorus which, while usually felt in the right or in the median line, may be on the left when the liver is large and occupies the whole of the right upper quadrant.

From what has been said it will be seen that almost all ulcers of the middle portion of the stomach move toward the left to an extent which is proportionate to the size of the tumor that forms around them.

In such cases the pylorus is usually near the median line, since it is pulled over toward the left by the traction of the tumor.

This tendency of ulcer tumors to move toward the left is most pronounced when the shape of the stomach has not been changed by the ulcer. The cicatrization of ulcers can distort the stomach in a great many different ways, such as drawing the pylorus toward the cardia when the ulcer is in the lesser curvature or in the formation of an hourglass stomach. As a result of this distortion an ulcer tumor that was originally to the left of the median line may be dragged over toward the right. Yet in 28 cases under Riedel's observation, only one, a right-sided tumor, occurred, and even then there was a long antecedent history of left-sided pain.

The tumor formed by the adhesion of an ulcer of the anterior wall to the left lobe of the liver is naturally rather easily demonstrated and can be detected even when it is still quite small. It manifests its presence by a resistance at first indefinite and later more pronounced under the left border of the ribs 2 or 3 cm. from the middle line. In thin people the left lobe of the liver becomes very prominent.

On the other hand, tumors arising from the adhesion of an ulcer of the posterior wall to the pancreas must reach a considerable size before they can be palpated through the anterior abdominal wall. The reason of this is their deep position, and the rigidity of the recti that is usually present from the pain. They are more readily palpable in women than in men, and with the stomach empty. However, under the best circumstances their detection is very uncertain, and sometimes they can be made out and not at all at other times. After they attain a considerable size they become quite evident. But long before the tumor is palpable the left-sided pain is very pronounced, referred to a point under the left costal margin.

Ulcers of the middle portion of the stomach should be diagnosed early, before an hour-glass deformity occurs. This should not be difficult if the presence of left-sided pain is given its true value. Its significance is greater because reflex pain almost never occurs to the left, while right-sided pain is not so certain in its indication of ulcer, because of the frequency with which referred or transmitted pain occurs upon or to the right of the middle line.

When left-sided pain is constant, remains in one spot, is greater after eating, and is accompanied by vomiting, its presence is conclusive evidence of the presence of an ulcer.

Sources of Pain Referred to the Stomach and Not of Gastric Origin. The conditions outside the stomach that may give rise to pain referred to the epigastrium or upper abdomen may be classified as follows:

A. Reflex causes.

B. Lesions of neighboring organs.

It will be seen that in all these conditions, with the rare exception of splenic abscess, the pain is in the median line or to the right of it.

A. Reflex Causes. 1. A rapidly developing appendicitis. Almost a third of such cases gives the history of onset of pain in the epigastrium followed by vomiting. A few hours later the pain moves down to the right lower quadrant, unless it remains around the navel in cases where the appendix lies in the pelvis.

2. Hernia of the linea alba often gives pain referred to the stomach.

3. Free epiploic appendages in the peritoneal cavity which have been

separated by torsion. These may be loose or adherent to the gut or omentum. In either position they produce more or less severe stomach pain, often without general disturbance of the patient.

B. Lesions of Neighboring Organs. 1. Acute inflammation of the gall-bladder usually produced by gallstones. Riedel makes the remark, which his great experience makes very significant, that 90 per cent. of all cases of cramp in the epigastrium are due to gallstones. The absence of jaundice in a great many cases of acute cholecystitis complicates the diagnosis.

2. Adhesions between the gall-bladder and liver, or between the duodenum and pylorus, very often produces pain referred to the pylorus.

3. A right-sided floating kidney adherent to the spinal column may simulate right-sided stomach pain.

4. In fat necrosis the pain depends upon the position of the inflamed tumors, and is sometimes in the middle line and may be on the left.

5. Abscess of the spleen may produce left-sided gastric pain, but this is rare.

6. Large duodenal ulcers adherent to the liver wall will cause right-sided pain. If such an ulcer is not adherent the pain is referred to the median line just above the navel.

Orthoform in Gastric Ulcer. Two years ago Murdoch[1] called attention to the possibilities of using orthoform in the diagnosis of gastric ulcer. The test is based upon the fact that orthoform will quickly dull the sensibility of the sensory nerves in ulcer of the mucous membrane, but has no effect on sensation when the mucous membrane remains intact. Murdoch administers the drug in doses of 8 grains, and finds that in cases of true ulcer the pain ceases within half an hour, but in gastralgia, neurosis, and pains from other conditions no such result is obtained.

TREATMENT OF GASTRIC ULCER. The Lenhartz[2] treatment of ulcer is growing in favor. The objections to it that I ventured to suggest in PROGRESSIVE MEDICINE last year do not appear to be warranted.

Ewald speaks of it with considerable favor, and references to the benefits derived from the method are becoming frequent in literature. Wirsing[3] has contrasted the results obtained by the use of the Leube treatment (rectal feeding, milk, and rest) in 320 cases with the Lenhartz method, which he has employed in 42 patients. The comparison shows that in cases without recent hemorrhage the percentage of ultimate cures is higher with the Leube method than with that of Lenhartz, while in cases with fresh bleeding the Lenhartz diet gives distinctly better results.

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[1] Medical News, October 8, 1904.

[2] PROGRESSIVE MEDICINE, December, 1904, p. 30.

[3] Loc. cit.

The reason why there are more relapses after a Lenhartz cure may be that the patients feel stronger and more energetic in convalescence after the more nourishing diet and consequently they are more apt to grow careless and allow themselves lapses in *régime* which favor renewed ulceration. After a Leube cure, on the other hand, the return to the normal condition is more gradual and without the temptation to self-indulgence.

Wirsing explains the apparent paradox that the heavier diet gives the best results with freshly bleeding ulcers by supposing that in cases without hemorrhage the Leube or milk diet offers less irritation to the ulcer, which heals more quickly than under the heavier diet, because general nutrition is not so much reduced as to seriously affect the healing. On the other hand, in bleeding ulcers the loss of blood has so lowered nutrition and hæmoglobin that these conditions are more serious drawbacks to healing than the irritation of the Lenhartz diet; consequently, although this method is a greater strain upon the digestion and more irritant to the ulcer, the general nutrition is so improved that healing takes place in spite of the local irritation.

Wirsing says that the benefit derived in bleeding ulcers is the most valuable part of the treatment, and he of late has reserved the Lenhartz method for bleeding cases and treats cases without hemorrhage by the Leube system as before.

He never found that the tendency to bleeding was increased by the diet.

In view of the recent progress made in the treatment of gastric ulcer by surgery it is interesting to see that such a high authority as Prof. Riedel, himself a surgeon, says that, as a rule, all medical methods of treatment should be proven useless before operation is resorted to.

Olive Oil in the Treatment of Gastrointestinal Diseases. The use of large doses of olive oil has been strongly recommended in irritative conditions of the stomach and duodenum, such as ulcer, spastic and organic pyloric stenosis, hypersecretion, hyperacidity, and the pain that occurs in an empty stomach, both in hypochlorhydria and achylia. Perhaps Cohnheim has been the most enthusiastic of the advocates of this mode of treatment. His methods of administration were given in PROGRESSIVE MEDICINE, December, 1904, p. 36.

Otto Blum[1] gives his experience with the remedy during the past year in Ewald's clinic in Berlin. He quotes Ewald to the effect that in his experience oil has not given wholly satisfactory results and Blum's own experience leads him to much the same conclusion, and fails to support Cohnheim's claims. Blum has tried the oil as Cohnheim directed upon

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[1] Berliner klin. Wochenschrift, 1905, Bd. xlii., No. 20.

18 cases of hyperacidity, hypersecretion, dilatation, chronic gastric ulcer, duodenal ulcer, and stenosis of the pylorus. Blum suggests that many of the cases of pain that were relieved by the oil in Cohnheim's list were really instances of pain due to hyperæsthesia of the gastric mucous membrane in cases of hyperacidity and were not gastric ulcers or erosions as Cohnheim assumed. I think this point is well taken and agree further with Blum that it is absolutely impossible to make a certain diagnosis of gastric erosions during life, a condition that Cohnheim claimed was much benefited by olive oil. Blum's conclusions are as follows: (1) He found that in general the oil was not liked or well tolerated, especially in the large doses recommended by Cohnheim. Much smaller doses seemed to achieve equally good results in favorable cases and were not nearly as likely to be followed by the nausea, vomiting, and loss of appetite that the larger doses caused. Even then the majority of patients either would not or could not take it. However, in a certain number of persons the oil caused no disturbance and certainly was of benefit. (2) In cases of hyperacidity with or without hypersecretion the oil inhibited HCl secretion and was of decided benefit in reducing gastric discomfort. Moreover, it regulated the bowel and helped nutrition. Whether or not this good effect was permanent could not be determined. Ulcers of the stomach and duodenum were not benefited, and in a few cases in which the oil was used hemorrhage followed promptly. Probably, however, the occurrence of bleeding was only a coincidence, as it is hard to see how oil could produce this result. Further, in high-grade pyloric stenosis and in decided gastric dilatation from any cause the oil is contraindicated because it is retained in the stomach and, becoming rancid, acts as an irritant. In none of Blum's cases did it seem to make the pylorus more patulous. In one undoubted case of pylorospasm, a condition in which Cohnheim claimed that the oil was almost a specific, it had no effect. The oil should be absolutely fresh, and Blum is frank enough to say that in some of the cases where its administration caused disagreeable results the oil that he used may not have been entirely good. I have used the remedy in several cases of malnutrition with irritated conditions of the gastrointestinal tract. In none of them did the oil seem disagreeable to my patients, while in one case at least it proved to be of the greatest benefit in a man with chronic diarrhœa. Examination of the stools showed imperfect meat digestion, and very good carbohydrate and fat digestion. He was given a diet consisting of carbohydrates, a very little meat, and a half-ounce of oil after each meal. His diarrhœa disappeared and he gained twenty pounds. I have found the most satisfactory way to give the olive oil is in milk after meals. The usual dose is two teaspoonfuls, increasing to a half-ounce in a third of a glass of milk three times a day.

Hyperæsthesia of the Gastric Mucous Membrane. Increasing emphasis is being laid upon the fact that hyperacidity—that is, a high percentage of HCl in the gastric contents—does not of itself cause unpleasant symptoms. It is a well-known fact that the secretion of HCl may be far in excess of what we consider its normal limit without the slightest discomfort to the patient or symptoms referable to the stomach.

Von Noorden[1] cites three cases and refers to many more in which hyperacidity was demonstrated in cases of neurasthenia without gastric symptoms.

To produce pain and dyspepsia there must be added a peculiar disturbance of the nervous mechanism of the stomach causing a hypersensitiveness of the gastric mucous membrane. Personally, I am of the opinion that this hyperæsthesia or sensory neurosis is the more important factor in the production of the symptoms usually referred to as those of hyperacidity—namely, pain and irritation coming on at the height of digestion and relieved by alkalies or more food. I believe this because many times patients will present themselves with exactly this history, including relief upon taking albumin and alkalies, in which repeated examination of gastric secretion shows a normal or even a subacidity.

The lining of the stomach in these cases has become so sensitive that normal or even subnormal amounts of HCl will produce the same degree of irritation as excessive quantities of free acid in less irritable stomachs. This observation is in no sense a new one, but is well recognized by everyone who has to do with gastric disturbances.

However, I wish to call especial attention to this hyperæsthesia of the gastric mucous membrane, because I believe it to be of more importance in the production of the symptom-complex usually spoken of as hyperacidity than is the excessive secretion of HCl itself.

The amount of pain and irritation appears to be more dependent upon the degree of hyperæsthesia than the amount of acid secreted.

The condition is evidently a sensory neurosis of the stomach, arising in the same conditions that produce the secretory neurosis.

The recognition of the importance of this element of hyperæsthesia in cases of hyperacidity does not modify the treatment. Even if the acid is normal or subnormal it must be neutralized by alkalies after the height of digestion and a bland proteid diet with good amounts of easily digested fats is indicated.

The condition that gives rise to the neurosis must be removed as far as possible by rest and by increasing nutrition, and it has been my experience that mild sedatives, as bromides, valerianate of zinc or chloral in small doses are valuable in the early stages of the treatment. In cases without excessive HCl the alkaline treatment must be stopped as soon as the pain and irritation are relieved, so that gastric digestion may not be interfered with.

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[1] Zeitschrift f. klin. Med., 1904, Bd. liii.

Hyperacidity and Constipation. In at least two-thirds of von Noorden's cases of functional hyperacidity there were cases of constipation found of such a degree that months passed without a spontaneous movement. It is often an extremely difficult point to decide in such cases whether hyperacidity or constipation is the primary condition. Probably in most instances hyperacid dyspepsia was primary and was followed by intestinal dyspepsia and constipation. However this may be, it has been the experience of von Noorden that dietetic treatment of constipation almost invariably benefits hyperacid dyspepsia and even the hyperacidity itself, so that as the stools became normal the percentage of free acid fell in proportion. The probable explanation of this is that there is a vicious circle established, and when this is broken improvement occurs in the primary as well as in the secondary morbid state, as is so often the case in such a condition. It is probable that no causal relationship exists between the two conditions, since hyperacidity may exist without constipation, while the contrary is also true, that constipation is not always followed by hyperacidity.

HYPERACIDITY AND MALNUTRITION. Cases of hyperacid dyspepsia are almost always badly nourished. The malnutrition may have preceded the appearance of gastric symptoms, or may have apparently been the result of the gastric disturbance.

Von Noorden is very strongly of the opinion that the state of the general nutrition has the most profound effect upon the course of the hyperacid dyspepsia in such cases. He does not go so far as to say that malnutrition is a primary condition, for there are many well-marked exceptions that would controvert such a statement. However, here also there is a vicious circle, and when this is broken the improvement in the hyperacid dyspepsia is most pronounced.

A course of treatment directed toward increasing the general nutrition and body weight is almost invariably followed by the disappearance of the gastric symptoms. The hyperacidity itself sometimes improves at the same time, but it cannot be said that this is always the case. However, the acid dyspepsia disappears, and if the excessive secretion of acid persists it is without symptoms.

Of course, the fact must not be overlooked that many cases of hyperacid dyspepsia are well or even overnourished, and then naturally other therapeutic measures are indicated. Measures directed toward increasing body weight are indicated in every variety of hyperacid dyspepsia with malnutrition.

This applies not only to cases of hyperacid dyspepsia in badly nourished neurasthenics, but to the other severer forms of acid catarrh as well. Naturally, however, the results here are much more uncertain, and the dietetic treatment of such cases must often be combined with intelligent use of various other remedies, such as lavage and drugs.

In the treatment of ulcers von Noorden gives an unqualified approval of the Lenhartz method, referred to in my article in PROGRESSIVE MEDICINE for last year.

Von Noorden, however, does not go quite as far as Lenhartz in the first ten days of treatment. During this period the diet is very limited in amount and character, but at the end of this time the food is rapidly increased so that during the second week the patient gets from 3500 to 4500 calories, and in the six weeks of an ulcer cure the patient will often gain from ten to fifteen pounds.

The value of the dietetic treatment may be summed up as follows: In cases of nervous hyperacid dyspepsia with great malnutrition a gain in weight is generally followed by entire relief and no other therapeutic measures are required.

In acid catarrh and ulcer with bad nutrition, measures directed to increasing body weight are a very important part of the treatment, but must be combined with other remedies before relief can be obtained.

Syphilis of the Stomach. This condition until recent years has had very little attention paid to it. The manifestations of syphilis in the stomach varies in the symptoms which it produces, and this renders the diagnosis during life very difficult and often impracticable except by the therapeutic test. Since Einhorn first classified the literature upon the subject there have been a few isolated cases reported. (See Lafleur's case, PROGRESSIVE MEDICINE, December, 1904.) Charles F. Hoover[1] reports three cases which were presumably syphilis. The diagnosis in all rested upon the fact that indefinite gastric symptoms in the syphilitic subjects were benefited by potassium iodide. In two cases the only symptoms referable directly to the stomach were pain and vomiting after food. Nothing abnormal could be detected on physical examination so far as the stomach itself is concerned. In the third case the stomach was considerably dilated. There was retention of chyme, periodic vomiting, but no tumor nor areas of tenderness could be detected. In each case the symptoms were removed by the administration of potassium iodide, and in every case they recurred to be again benefited by the use of the same drug. In the third case death ensued in one of the relapses before relief could be obtained. It is probable that the lesion in the last case was a gumma pressing upon the pylorus.

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[1] Cleveland Medical Journal, September, 1904, vol. iii.

The Stomach Function in Tuberculosis. It is generally known that functional disorders of gastric digestion are a frequent manifestation of the early stages of tuberculosis of the lungs. Indeed, the stomach symptoms are often more prominent than those referred to the lung, and have many times led to errors in diagnosis. These digestive disturbances in early phthisis are probably toxic in origin and arise from an impression made upon the nervous mechanism of the stomach.

Munson[1] examined the stomach in 26 cases of pulmonary tuberculosis and discovered a general tendency toward a diminution in the secretion of HCl. The pepsin was affected to a less degree, while motility was normal. The first group of Munson's cases (10 cases) embraced those in which the disease of the lung had not existed for longer than nine months. In eight of these patients there was a history of stomach trouble which in some cases antedated the lung condition and in others developed simultaneously with it. Hydrochloric acid was diminished four times and absent once, while peptic digestion was unchanged.

In the second group, including 11 more advanced cases, HCl was absent in 3 and diminished in all. In 5 cases in the later stages of the disease free acid was absent or diminished four times. Here peptic digestion was also diminished.

Tuberculosis of the Stomach. Primary tuberculosis of the stomach is extremely rare. There appear to be but 3 well-substantiated cases on record. The last of these was reported by Ruge[2] quite recently. The patient was a man, aged fifty years.

At autopsy the pathological diagnosis made upon the gross appearance of the organs was as follows: Carcinoma of the stomach with metastasis in the ribs and abdominal lymph glands, pleuritis, and carcinomatous peritonitis. However, microscopic examination showed that the supposed carcinoma was really tuberculosis. The process seemed to originate in the stomach and was apparently primary there. The form of the disease, especially in the serous membranes, resembled the new-growths of pearl disease in cattle, and this suggested the possibility that the infection may have been from the drinking of milk.

Diaphragmatic Hernia of the Stomach. Knaggs[3] has collected 63 cases, including 3 of his own: 20 were congenital, 21 traumatic, and 12 acquired in other ways. In this last group the hernia took place through one of the natural openings in the diaphragm, especially that through which the œsophagus passes, by the separation of the muscle bundles. The hernia of the stomach may be complete or incomplete and the sac may even contain parts of other viscera. The symptoms were various and irregular, but usually consisted of disturbance of respiration, and digestion and signs of obstruction and strangulation, and especially tetany. The physical signs are often indefinite. The presence of stomach and intestinal murmurs in the thorax and displacement of the heart are symptoms of much diagnostic importance. A murmur can often be elicited by pressing the air through the contracted portion of the stomach. Other signs are the disturbance of pulmonary murmur and resonance, the alteration in the shape of the thorax, the sunken epigastrium and inability to lie upon the right side.

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[1] New York Medical Journal, March 18, 1905.

[2] Beiträge zur Klinik der Tuberculose, Bd. iii., part iii.

[3] Lancet, August 6, 1904.

The lesions found at autopsy were adhesions, chronic ulcer, dilatation, perforation and strangulation of the stomach, and obstruction caused by volvulus of the stomach or torsion of the lesser omentum.

Acute Dilatation of the Stomach. Hoffmann[1] reports a case which demonstrates that acute and fatal dilatation of the stomach may occur with very little warning and apparently from very slight causes.

The most important symptoms of its onset are uncontrollable vomiting associated with dulness in the left half of the abdomen and the information derived by the use of the stomach tube.

He is of the opinion that acute dilatation never occurs in an entirely healthy stomach, but that there must be some condition favoring its development. This is oftenest atony associated with a slight degree of dilatation. Under such circumstances a slight error in diet, often so trifling as to make it very difficult to determine what it really was, is all that is needed to produce extreme dilatation with stagnation of food, especially of fluids; consequently great thirst and suppression of urine are prominent symptoms of the condition.

An interesting feature of the case that Hoffmann reports was the enlargement of the head of the pancreas, which was thickened and harder than normal. In the microscopic examination small islands of necrosis were found scattered through the organ.

Gastric Contents in Lead Poisoning. Sailer and Speese[2] have studied the gastric contents of a series of 12 cases of acute and chronic lead poisoning in the Philadelphia General Hospital, and find that the secretion of HCl and pepsin was decidedly affected. Their results were quite uniform and therefore seem conclusive, although their series of cases was small. Free HCl was absent in every case with an average total acidity of 11. Lactic acid was present in every case and Oppler-Boas bacilli were not found.

The peptic digestion was absent in 3 cases and reduced in the rest. In 6 of 7 cases basic degeneration of the leukocytes was found.

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[1] Münchener med. Wochenschrift, 1904, Bd. li., No. 45.

[2] Journal of the American Medical Association, May 13, 1905.

Sailer remarks that medical literature is curiously silent as to gastric digestion in lead poisoning. This is remarkable, since abdominal symptoms are usually very prominent in that condition. The mechanism of the alteration of secretion is not clear. Whether it is a functional disturbance or whether there is some structural alteration is not known, since there has never been any systematic investigation of the gastric mucous membrane of fatal cases.

Suppression of HCl Secretion in Malignant Disease of Other Organs Besides the Stomach. The reason for the suppression of HCl secretion in the stomach in cancer of that organ is a problem that has interested many observers; while HCl is not invariably absent in carcinoma ventriculi, still its presence is exceptional, its absence is constant enough to serve as strong evidence of malignant disease in a differential diagnosis.

The different theories that have been advanced to explain the achlorhydria of cancer of the stomach were fully considered in PROGRESSIVE MEDICINE, December, 1903 (p. 30). No reference need be made to the subject here further than to say that no explanation has been advanced as yet which satisfactorily covers all cases. Now, Benjamin Moore, Professor of Biochemistry in the University of Liverpool,[1] has made several interesting observations that throw a new light upon the achlorhydria of cancer.

His study of seventeen cases of cancer not of the stomach but of almost every other portion of the body appears to show that the absence of hydrochloric acid in carcinoma ventriculi is not due to local action in the stomach, for hydrochloric acid is absent or reduced greatly in amount whatever may be the situation in the body of the malignant growth.

The examinations were made after an Ewald breakfast in cases of malignant disease of the uterus, mamma, prostate, rectum, tongue, cheek, mouth, etc.

In two-thirds of the cases free HCl was entirely absent, while in the remaining third the amount secreted was much below the normal, being reduced to a mere trace in all except one case.

This work of Moore and his associates puts a new aspect upon the gastric chemistry in cancer. His observation is an extremely important one, and if it is substantiated by subsequent experiments, it will force us to revise our methods of diagnosis in cancer of the stomach.

His work was very thorough and painstaking, and each analysis was controlled by most of the known tests for hydrochloric acid free and combined.

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[1] Lancet, 1905, i. p. 1121.

Moore attempts some explanation of the suppression of HCl secretion based upon the theory that depression of the concentration of the hydrogen ions of the plasma would interfere with HCl secretion.

THE INTESTINES.

Clinical Examination of the Stools. If we consider the progress made in the study of diseases of the intestines in recent times we must be impressed with the great lack of accuracy and comprehensiveness in our knowledge of intestinal pathology. Appendicitis, intestinal obstruction, and some of the more severe inflammatory conditions of the bowel itself form the sum total of the well-known intestinal diseases.

We know absolutely nothing of the pathology of lighter grades of inflammation or of the functional changes in which no anatomical lesion can be found by our methods of examination. Recent investigation into intestinal digestion, such as the discovery of the enzymes of the succus entericus and their close relation to pancreatic secretion, and our growing knowledge of the part of digestion performed by the secretions of the liver and pancreas, unfortunately tend rather to confuse than to make it easier to formulate accurate methods of clinical research. This is because certain changes in the feces, such as abnormalities in the digestion of fats, starches, and meat fibre may be produced by disturbance in any one of several different secretions or organs.

A very good example of this is found in the significance of unchanged muscle fibre in the stool. It may be undigested either because pancreatic secretion is imperfect or because intestinal secretion does not furnish the "activating enzyme," enterokinase, needed for the activity of pancreatic digestion, or, thirdly, because peristalsis is increased so that the food was swept through before digestion could take place.

We need a clinical method of diagnosis of intestinal disease and also, not less important, a method of determining how perfectly food is being digested and absorbed, and, in case either of these functions is disturbed, where the fault lies; in other words, a method by which we can regulate the diet of our patients by knowing definitely how perfectly different articles of food are digested.

Physiological chemistry offers the best solution for the problem of regulation of diet, but it is not well suited for routine clinical work because it is not rapid enough to enable us to watch a good number of patients at once. Besides, such methods are beyond the reach of all but trained chemists or those able to command the resources of such a laboratory. On the whole the method suggested by Adolph Schmidt, of Dresden,[1] best fulfils the requirements of clinical methods for diagnosis of disease and regulation of diet. However, as I have said, the complexity of the digestive processes in the intestine is so great that any method founded upon the examination of the feces alone must at best be very imperfect.

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[1] Die Funktionsprüfung des Darmes mittels der Probekost, etc., Wiesbaden, 1904.

I have tested his method in my own work and found it of great help in certain cases, and so venture to present it somewhat in full to the readers of PROGRESSIVE MEDICINE.

Schmidt demands two conditions for a satisfactory clinical method of examination of the feces.

1. A knowledge of what a normal stool should be under a certain diet involving the use of a "test diet."

2. The methods of examination must be as simple as possible so as to be within the reach of everybody. The examination proposed by him can be readily completed in ten minutes if one is well practised in the various steps.

1. The test diet. The requirements are:

(*a*) That it must be nutritious enough to furnish calories sufficient for the body's needs.

(*b*) It must be so constituted that it can be obtained in any household or hospital dietary.

(*c*) It must contain a constant amount of certain articles so that variation in digestion and absorption can be detected in the stool.

Schmidt suggests the following diet, which has been slightly modified by many different observers, but which remains the basis of all "normal or test diets:" 1.5 litres milk, 100 gm. zweiback, 2 eggs, 50 gm. butter, 125 gm. very rare or raw beef, 190 gm. potatoes, and gruel from 60 gm. of oatmeal, and 20 gm. sugar.

In my own work I have translated this into American terms suited to a hospital or private kitchen as follows: 3 pints milk, 6 pieces well-dried toast, 2 to 4 eggs, 1½ oz. butter, ¼ pound tender rare steak, 6 oz. mashed boiled white potato, and gruel made from 2½ oz. of ordinary oatmeal, ½ oz. sugar. This may be given somewhat as follows:

Breakfast: 2 eggs, ⅓ of the amount of toast and butter, 2 glasses of milk, oatmeal, milk and sugar.

Dinner: The steak and potatoes, ⅓ of the amount of toast and butter, 1½ glasses milk.

Supper: 2 glasses milk, remainder of toast and butter, 1 or 2 eggs if desired.

This diet is not enthusiastically received by the average patient who is not seriously ill, because of its limitations in amount of food allowed; however, it has the advantage of being suitable for almost any gastrointestinal case, and, moreover, is only given for a period of two or three days. A capsule containing 5 grains of carmine or charcoal is given with the first meal and no examination is made until a red (or black) stool appears.

The amounts of each article given must be measured accurately at first, and then when the number of slices of toast, quantity of cooked oatmeal, etc., is fixed in the attendant's mind each article need not be weighed at each meal. This does not apply to the meat and potatoes, which should be weighed every day.

The period of time required for the passage of food through the gastrointestinal canal is of importance and can be easily determined by watching for the first red stool. The significance of this "period of passage" is considered below.

The examination of the stool consists of the following steps: The consistency, color, and smell must be observed. Then a piece of formed stool as big as an English walnut or an approximately equivalent amount of liquid feces is rubbed up in a mortar with distilled water until it is quite smooth and liquid.

Part of this is poured into a large Petri dish or upon a glass plate and examined in a good light and over a dark background. I have found the Petri dish a very great convenience in this part of the examination, as its sides prevent the material from spilling. A little experience will enable the observer to acquire a surprising amount of information about the composition of the stools by this macroscopic examination alone.

In normal digestion very little should be seen by the naked eye except small brown points (oatmeal or cocoa hulls) and occasionally sago-like grains that look like mucus, but which the microscope shows to be grains of potato.

Pathologically there may be: 1. Mucus in large or small flakes which is not affected by rubbing in the mortar. The smaller the flakes the harder it is to recognize them, but in my experience, which agrees with that of Schmidt, none are so small as to escape detection if the stool is examined in the manner described. The mucus appears as glassy, translucent flakes, often stained yellow by bile pigment. Doubtful cases can be decided by the microscope.

2. Pus, blood, parasites, stones, and foreign bodies that do not call for especial comment.

3. Remnants of connective tissue and sinew from the beefsteak. These can be detected by their whitish-yellow color and their toughness, by which they can be distinguished from mucus.

In case of doubt a piece should be examined microscopically with a drop of acetic acid. Connective tissue then loses its fibrous structure, while mucus becomes more thread-like.

Small single pieces of connective tissue can be found in normal stools, but when they are numerous and large their presence indicates decided impairment of gastric digestion.

4. Remnants of muscle fibre. These appear as small, reddish-brown threads or small, irregular lumps. When they can be easily recognized by the naked eye and are quite numerous it shows impaired intestinal digestion.

5. Remnants of potato. As was said, these look like grains of boiled tapioca and may be easily confused with mucus. The microscope will show the true nature of the bodies.

6. Large crystals of acid phosphate of ammonia and magnesia. These occur in foul stools and can be recognized by their shape and chemical reaction (solubility in all acids).

The *microscopic* examinations confirms the naked-eye inspection. Three slides are prepared from the liquid feces. The first is merely a drop of the material to be examined under high and low powers. The second slide is prepared by mixing a drop of material with a drop of acetic acid (U. S. P.), heating it to boiling, and then putting on a cover-glass. The third is a drop of material with a drop of weak Lugol solution (iodine 1, potassium iodide 2, water 50).

Normal Stool. The first slide will show:

(*a*) Single small muscle fibre, colored yellow, usually with the cross-striation. Visible with Leitz 3, but showing better with Leitz 5, Oc. 3.

(*b*) Small and large yellow crystals of salts of fatty acid.

(*c*) Colorless (gray) particles of soap.

(*d*) Single potato cells, without distinguishable contents.

(*e*) Particles of oatmeal and cocoa shells.

In the second slide a general idea can be obtained of the fat contents of the stool.

Upon cooling, small flakes of fat acids can be seen over the whole preparation. The large crystals of salts of the fatty acid and the soap are broken up by the acetic acid and the fat acids are liberated. If the slide is heated again and examined hot the fat acids will be seen to run together in drops, which, as the slide cools, break suddenly apart.

In the third slide there should be violet-blue grains in some of the potato cells and small, single, blue points, probably fungi spores.

Pathologically there may be:

I. slide.
  (*a*) Muscle fibre in excess, perhaps with yellow nuclei.
  (*b*) Neutral fat drops or fatty acids in crystals.
  (*c*) An excess of potato cells, with more or less well-preserved contents.
  (*d*) Parasite eggs, mucus, connective tissue, pus, etc.

II. slide. Fat acid flakes in excess.

III. slide. Blue starch grains in the potato cells or free oatmeal cells, fungus spores or mycelia.

The Chemical Examination. This comprises only three routine tests, with a possible fourth. They are the reaction, sublimate test for the condition of the bile salts, the fermentation test, and, perhaps, the estimation of the "lost" albumin.

The reaction of the stool, which is quite difficult to get by the use of litmus paper, can be very easily determined by dropping a little softened fecal matter into 5 or 10 c.c. of a weak, watery solution of litmus, shaking it and noticing the change.

The sublimate test consists in taking a few cubic centimetres of the liquid feces and mixing it with an equal amount of 25 per cent. watery solution of $HgCl_2$. A normal stool will quickly turn a pinkish-red, indicating the presence of hydrobilirubin, which will be the more intense the fresher the material. A green color, even if it is detected microscopically, is pathological and indicates unchanged bile pigment.

The Fermentation Tests. The apparatus used is described in the illustration. My own modification follows very closely Strasburger's instrument, but is more easily made and repaired. (See Fig. 3.)

About 5 gm. of fresh-formed feces is taken or an equivalent amount of thinner material. (See Koziczkowsky's table below.) This is rubbed up with sterile water and poured into the main bottle *a*. This is filled with sterile water; tube *b* is filled with water and fitted in place (not necessarily entirely full) and tube *c* is then fitted on (empty). The reaction is carefully noted before the test is started. The apparatus is then stood in a warm place—best is an incubator at 37° C.—for twenty-four hours. If gas forms by fermentation in *a* it will give rise into *b* and the amount will be indicated by the water displaced into *c*. Normally, the fermentation test should show practically no gas, and the original reaction of the material should be unchanged after twenty-four hours. If more than one-third of the tube *c* is filled it is pathological. If then the reaction is decidedly more acid it is a carbohydrate fermentation; if alkaline and with a foul smell it is a fermentation of the albumins.

Estimation of the "lost albumins" or albumin residue. A qualitative test may be made as follows: A softened portion of the stool is filtered (often a slow and difficult process), the filtrate is shaken with silicon and refiltered, then is saturated with acetic acid to bring down the nucleoproteids, and then a drop of ferrocyanide solution is added. A decided precipitate indicates albumin. A positive test shows only that there is a decided diminution in albumin digestion. Where this occurs must be decided by other means.

Koziczkowsky[1] has devised an ingenious method of determining the albumin residuum of the feces. He employs a test diet almost identical with that of Strauss. It consists of 1½ litres of milk, ¼ litre of bouillon, 6 gm. zweiback, 40 gm. oatmeal, 40 gm. butter, 2 eggs, 80 gm. scraped meat, and 200 gm. of mashed potato. Koziczkowsky employs a known

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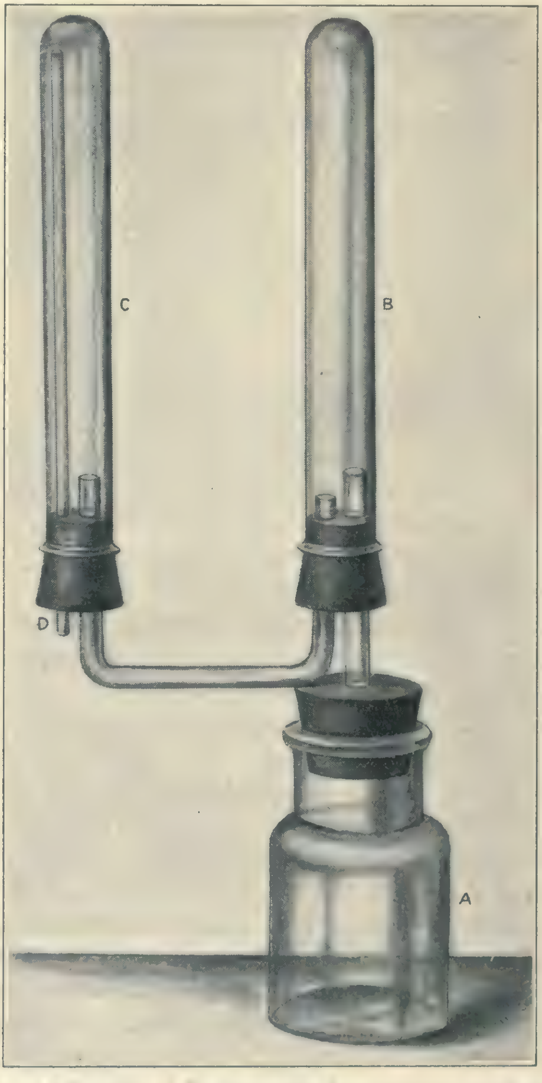
[1] Deutsche med. Wochenschrift, 1904, Bd. xxx., No. 33.

FIG. 3



The author's modification of Strasburger's fermentation apparatus. It is constructed of perforated rubber corks, bent glass tubing, and two test-tubes each of 30 c.c. capacity. The small glass tube *D* runs up to the top of the test-tube *C* to allow for the escape of air, instead of the test-tube being perforated, as in Strasburger's apparatus.

weight of the stool in his method, but finds it cumbersome and unnecessary to dry the stool for the purpose of weighing it. To avoid this he has determined the relative weight of dry and fresh fecal matter of various consistencies, and so simplifies the procedure considerably. The following shows these relative weights: 1 gm. formed stool contained about 0.3 gm. dry substance; 1 gm. semiliquid stool (good fat absorption) contained about 0.25 to 0.27 gm. dry substance; 1 gm. semiliquid stool (poor fat absorption) contained about 0.20 to 0.24 gm. dry substance; 1 gm. liquid stool contained about 0.116 gm. dried substance.

The method consists in estimating the albumin residuum in a given weight of stool by digesting it with pepsin and HCl, then measuring the HCl consumed. Two portions, each representing 2 gm. of dried fecal matter, are taken and washed separately upon nitrogen-free filters with strong alcohol, then with absolute alcohol, and finally with dilute HCl of the strength of 3 parts in 100. One portion of the stool is then mixed with 50 c.c. of a solution containing dilute HCl, 10 c.c.; pepsin, 30 gm.; water, 100 c.c., and the other portion with the same quantity of HCl solution without the pepsin. Both flasks are corked and kept in the incubator twenty-four hours. Before sealing the flasks the amount of HCl in each portion is estimated by titrating it with 0.1 normal NaOH solution. After incubation over night the acid is measured again by titration. The flask in which there is no pepsin will show the digestive power remaining in the feces, due to the presence of proteolytic ferments. Rarely are such present, and the difference between the first reading of free HCl and the second reading in this flask seldom exceeds 2 or 3 points in terms of decinormal NaOH. The total acidity and HCl is then taken in the pepsin flask by the usual methods, with phenolphthalein and dimethylamidoazobenzol as indicators. The difference will show the amount of acid consumed in the digestion of the albumin present. In normal stools this is usually between 15 and 18 points. Koziczkowsky gives no record of the tests in different diseases, owing to his lack of material. The test is much the simplest yet devised for the estimation of albumin residuum, and deserves more extended investigation.

THE CLINICAL SIGNIFICANCE OF THE TESTS. *Mucus.* As a rule the appearance of mucus in the stool indicates the presence of inflammation of the mucous membrane, and is the one trustworthy sign of that condition. There are two conditions in which mucus has no significance: (1) Thin mucus spreads over the surface of a hard, dry ball of feces without evidences of a rectal inflammation. (2) So-called mucous colic, with discharge of mucous casts.

As a general rule the form of mucus indicates the part of the intestine from which it comes, although there are many exceptions.

Bile Pigment. A green color of part or all of a stool (by the sublimate test) is pathological, except in children. It means too short a period of passage through the intestine, and that time for a normal reduction process of the bilirubin into hydrobilirubin was lacking. A normal fresh stool should give a pink color with HCl_2. If a color action of any kind is absent it indicates a very fat stool or an absence of bile in the intestine.

Fat. It will need a little practice to tell by the use of the diet whether there is an increase of fat in the stool. And as the normal amount of fat in the feces varies between wide limits, only a very considerable excess of fat can be detected.

The examination for fat given here is useful in watching the digestion and absorption of various amounts of fat, and in that way I have found it valuable. For instance, in one case in which there was considerable emaciation caused by a diarrhœa from insufficient proteid digestion, fats were found to be well borne, and olive oil and butter-fat were given in increasing amounts until the presence of an excess of soap and neutral fat indicated the limit of absorption and digestion. Under this diet the patient's diarrhœa stopped and he gained twenty pounds in weight.

Remnants of Meat. Normally there should be only microscopic particles of connective tissue and muscle fibre. An excess of either is often visible to the naked eye, but need not be macroscopic to be pathological.

Excess of Connective Tissue means insufficient gastric digestion, because such fibrous tissue is only digested by the juices of the stomach. The meat should be rare to give this test its full value.

Even in hyperacidity such remnants may be in excess if motility is increased.

Excess of Undigested Muscle Fibre means disturbance of intestinal digestion and probably means trouble in the upper part of the small intestine; but whether the trouble is in the trypsin of the pancreatic secretion, or in the activating action of the succus entericus, or in increased peristalsis, we can only surmise from other symptoms.

Connective tissue and muscle fibre together are sometimes found when the stomach fails to digest away the framework of fibre and the intestinal juices have no chance at the bundles of muscle fibre; thus meat lientery occurs often in acute gastric catarrh.

Pathological Carbohydrate Fermentation means poor starch digestion and indicates, as a rule, disturbance in the small intestine and usually is due to insufficiency in the succus entericus.

Pathological Albumin Fermentation means a large remainder of albumins in the feces, and indicates in Schmidt's experience serious trouble, usually some anatomical change in the mucous membrane of the small intestine. I cannot confirm this statement from my own experience or from the experience of other observers.

Hemmeter[1] has had considerable experience with this method of examination of the stool. He has tested 8 cases of achylia gastrica and 6 cases of chronic atrophic gastritis with entire absence of HCl and ferments. In all 8 cases of achylia and in 5 cases of gastritis undigested connective fibre was found in the feces.

In 2 cases of heterochylia (variable gastric secretion—hyperchlorhydria alternating with absolute achylia in the same person) connective-tissue fibres were found only during the period of achylia. Hemmeter found that the administration of 10 c.c. of dilute hydrochloric acid (U. S. P.) with 1 gm. of pepsin diluted to represent gastric contents caused perfect gastric digestion during the periods of achylia. Thus, the amount of hydrochloric acid and pepsin can be estimated in individual cases by watching for connective tissue in the feces.

The Estimation and Clinical Significance of the Period of Passage of Food Through the Gastrointestinal Canal. The question of the length of time required for the passage of food through the gastrointestinal tract is a matter of much clinical importance and yet very little attention has been paid to the subject and no reliable data are on record. It is quite as important for the practitioner to know the period of passage as it is to ascertain how often a patient has a stool, for the two things are in no way identical. Thus, for example, a patient may have only one stool a day and yet have latent constipation which gives rise to toxic symptoms, for which the real cause is seldom recognized. Whether latent constipation is present can only be determined by estimating the period of passage or, to use the German word, the *Verweildauer*. In diarrhœa, by estimating the period of passage, it is possible to come upon an approximate idea of the seat of disturbance producing the diarrhœa. For example, if the period of passage is nearly normal the trouble lies in the lower or middle portion of the large intestine, and peristalsis is probably not increased in the small bowel. Strauss has shown that chronic colitis with several watery movements a day may be accompanied by a normal period of passage, while the period was decidedly shortened when the inflammation was in the ascending colon or small intestine. As in all other investigations into the intestinal functions, a test diet is necessary, since naturally the character of the diet has much influence upon the period of passage. Strauss found that under his test diet, containing 100 gm. of lean meat, the period was ten to twenty hours in normal cases and was increased as high as sixty hours in constipation. Maurel found that the period was thirty-six to forty-eight hours under a pure milk diet. In the test diet used by Koziczkowsky the normal period was fifteen to twenty-four hours. In disease the shortest period was four hours, and in such cases the bilirubin was found unaltered and gave a green color with the sublimate test. The period of passage is very easily estimated by marking a meal with carmine and watching for the first red stool.

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[1] American Medicine, March 11, 1905.

Occult Blood in Typhoid Fever. Two series of observations upon occult blood in the stools of typhoid fever patients have appeared during the past year. One is by Petrachi[1] and the other is included in my own series.

It would be natural to expect occult bleeding in typhoid fever, especially in the second and third weeks, when the ulcers are freshest and more liable to hemorrhage.

I tested 92 stools in 19 cases of typhoid and found occult blood once each in 3 different patients—none of whom had visible hemorrhage while under observation. Consequently, I think that these 3 cases were examples of true occult bleeding in typhoid fever.

The stools were always examined in the febrile stage, and 80 of our 92 tests were made in the interval from the second to the fourth week, when the ulcers should be freshest and more liable to bleed. We have no data as to the stools in the first week, as none of our patients were admitted until the beginning of the second.

The weeks of the disease in which the tests were made are as follows:

Second week	22 tests,	2 positive.
Third week	28 "	1 "
Fourth week	30 "	all negative.
Fifth week	8 "	" "
Sixth week	4 "	" "

The cases may be tabulated in accordance with their severity as follows:

Severe	7 cases,	1 positive.
Moderate	8 "	1 "
Mild	4 "	1 "

Petrachi has published the results of a systematic examination of the stools in 18 cases of typhoid fever. His proportion of positive cases is much greater than mine, for in 8 of his patients he found occult blood 42 times, independent of visible hemorrhage. Most of his tests were made in the second and third weeks, as in our series, and the proportion of severe, moderate, and mild cases in our two lists is strikingly alike, yet the results of the two series of observations differ radically; for while we found one positive reaction in each grade (or 3.5 per cent. of our cases), Petrachi found 42 positive tests, or 44 per cent. of his cases, the majority being of the severe and moderate types.

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[1] Loc. cit.

I cannot explain the lack of agreement in the two series of investigations, for we both used the aloin test, and our cases were very similar in severity, and the stools were examined at the same period of the disease.

Petrachi's table of severity was as follows:

Severe	6 cases,	4 positive.
Moderate	8 "	4 "
Mild	4 "	all negative.

I began with the hope that it might be possible to foretell the occurrence of visible hemorrhage by demonstrating occult blood in the stools some time before visible bleeding appeared. The importance of this is very apparent, since it might be possible to lessen or prevent visible hemorrhage by modifying the treatment as soon as occult bleeding indicated that a large hemorrhage was about to occur. In this I was disappointed, although my investigations have not been extensive enough to be conclusive. In 4 of my cases visible hemorrhage occurred while the patient was under observation. In 2 of them the stools were examined systematically before the hemorrhage occurred, always with a negative result. In the other 2 cases the hemorrhage occurred so soon after admission that a careful study of the stools could not be made.

It will be seen that a prehemorrhagic stage was not demonstrated and no warning of large hemorrhages was given by the presence of occult blood.

Petrachi, on the other hand, regularly found occult blood for one to five days before visible blood appeared in the stool, and he thinks that in this way he can foretell the occurrence of large hemorrhages.

Neither series of observations is large enough to be conclusive, and the subject needs further investigation.

The Movements of the Alimentary Canal. Much interesting work has been done in the physiology of the digestive tract during the past year. Not the least important is that relating to the mechanical factors in digestion, which are a very much more complicated and perfected mechanism than we had supposed before the work of Cannon and others appeared. I cannot do better than to quote freely from Cannon[1] in order to show how these advances in physiology have the most practical and immediate bearing upon the symptomatology and therapeutics of the gastrointestinal tract. Cannon's work kas been carried out largely by the use of the *x*-ray in the Harvard Physiological Laboratories.

The mechanical factors in digestion perform three chief functions—the movement of the food through the alimentary canal, the mixture of the food with the digestive juices, and the exposure of the food to the absorbing mucous membrane. The progressive peristaltic wave is the most general activity by which these functions are effected, but the progression of the food through the canal is not uniform. Where digestive juices are lacking and absorption does not occur, as in the œsophagus, the food is moved rapidly. On the other hand, where digestion and absorption can take place, rapid progression is prevented by sphincters, and the recurring peristaltic waves passing over the food toward closed sphincters serve to mix the food with the digestive juices, as in the stomach, or expose the food to the absorbing mucosa, as in the ascending colon. In the long course of the small intestine, with no sphincters present to oppose peristalsis, peristaltic activity is infrequent, and the mixing and exposing functions are carried on by a special method—the rhythmic contraction of the circular fibres. These rapidly repeated contractions knead the intestinal contents without any considerable progression.

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[1] Medical News, May 20, 1905.

From the foregoing general considerations it is evident that different portions of the alimentary canal are characterized by particular adaptations of the general method of forwarding, mixing, and exposing the food.

The Œsophagus. Liquids may be shot through the gullet by the contraction of the mylohyoid muscles, as through a stiff tube, as suggested by Kronecker and Meltzer, but Cannon's investigations show that the passage of solid and semiliquid food is accomplished by the contraction of the œsophageal muscles.

The Cardia. Its function is probably to keep the passage into the stomach free from an accumulation of food and, when necessary, to prevent regurgitation. Cannon has made an interesting and remarkable observation upon the cat and has seen rhythmic relaxations of the cardia, so that fluid food streams from the stomach into the œsophagus, even above the level of the heart, then is pressed into the stomach again by a peristaltic wave, only to be released a moment later to pour into the œsophagus anew. He has watched this activity, recurring at intervals of one or two minutes, for more than a half-hour. It usually begins soon after fluid food is given; within a varying period the intervals between discharges gradually lengthen, until the action entirely ceases and the cardia seems tightly closed. During this ebb and flow of food in the œsophagus the animal evinced no signs of distress, and, if allowed her freedom, did not vomit. On re-examination the movements were again seen. The regular appearance of these phenomena in different animals makes Cannon think that they must be normal. It may be that relaxations of the cardia of this character are associated with eructations of gas and stomach contents in cases of gastric fermentation.

This rhythmical ebb and flow of food back into the lower œsophagus may be intended to flush the accumulated food down into the stomach and prevent accumulation.

The Stomach. The stomach is a place of storage for the food, and also a place in which carbohydrate and proteid digestion may occur. These functions of the stomach are performed in different parts of the organ.

Undoubtedly the most important feature of the newer physiology of the mechanics of the stomach is the knowledge that it consists of two parts physiologically distinct. The larger, left part of the stomach is the cardiac portion; the right is the pyloric portion. The pyloric portion is characterized during digestion by the continuous passage of peristaltic waves over its surface to the pylorus. The cardiac portion is without peristalsis, but as the food is pressed from the pyloric portion into the intestine the muscles of the fundus by tonic contraction squeeze the contents into the more active division, as into a hopper.

The efficiency of peristalsis in mixing the food with the gastric secretions depends upon the contraction of the pyloric sphincter. So long as the sphincter holds, each constriction ring coursing from the middle to the end of the stomach presses the food into a blind pouch; the food, unable to escape through the pyloric opening, has as its only outlet the opening in the advancing ring. This is an admirable device for bringing the food under the influence of the glandular secretions of the pyloric region, for, as a constriction occurs, the secreting surface enclosed by the narrowed muscular ring is pressed close around the food within the ring. As the constriction advances it continually presses inward fresh glandular tissue, and, furthermore, as the constriction advances, a thin stream of food is continuously forced back through the ring and thus past the mouths of the glands—a food stream sweeping in one direction past an ever-refreshed mucous surface moving in the opposite direction. Thus is the food repeatedly exposed to the secreting surface of the pyloric end and thoroughly mixed with the gastric juice.

The larger cardiac end of the stomach is the reservoir for the food. As peristaltic waves are absent, the food remains unmixed with the gastric juice and the inner parts may retain their original reaction for even two hours.

Thus, salivary digestion may go on unchecked by free acid for a long time in the cardiac end.[1]

The Pylorus. Differing views have been set forth as to the manner in which the pylorus opens and permits the exit of the food. Some investigators have declared that the sphincter relaxes only at the end of several hours to allow the stomach to empty. Observations under more natural conditions, with the stomach tube and with the x-rays, show that the stomach is not emptied at once at the end of gastric digestion, but progressively during the period. There is thus an intermittent closure of the pylorus. The channel is usually closed, yet occasionally it opens; and when it opens, the peristaltic waves, usually engaged in churning the food, now serve to propel it into the intestine.

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[1] Progressive Medicine, December, 1904, p. 64.

The factors affecting the pylorus are as yet but little understood. It seems probable that the signal for relaxation is the presence of free hydrochloric acid on the stomach side of the pylorus.

In the Harvard Physiological Laboratories last year it was proved that when carbohydrates, proteids, and fats of the same consistency are separately fed in equal amounts, they do not leave the stomach at the same rate. Fats remain long in the stomach; the discharge begins slowly and continues about as rapidly as the fats are absorbed or passed into the large intestine. Carbohydrates begin to leave the stomach soon after their ingestion (within ten minutes); they pass out rapidly and at the end of two hours reach a maximum amount in the small intestine—almost twice the maximum for proteids and two and one-half times the maximum of fats—both of which maxima are reached only at the end of four hours. Proteids frequently do not leave the stomach at all during the first half-hour and occasionally not for an hour. After two hours they accumulate in the small intestine to a degree only slightly greater than that reached by carbohydrates an hour and a half earlier. The departure of proteids from the stomach is much later than that of carbohydrates and slower than either carbohydrates or fats. Consequently there appears to be a remarkable mechanism in the pylorus which permits carbohydrates, not digested by the gastric juice, to pass quickly into the intestine, and retains the proteids, digested in the stomach.

If the presence of free acid on the stomach side of the pylorus stimulates the relaxation of the sphincter, this mechanism is largely explained. The theory of the action of the pylorus which Cannon suggests is as follows: Free acid in the stomach opens the pylorus and initiates the chemical control of the sphincter. The opening of the pylorus permits the exit of a portion of the acid chyme. We have seen that acid in the duodenum keeps the pylorus closed; but acid in the duodenum also stimulates the flow of the alkaline pancreatic secretion. No inorganic acid is normally present beyond the first few inches of the small intestine. The acid, therefore, is here neutralized. As the neutralizing proceeds, the stimulus closing the pylorus is weakened, until the acid in the stomach again opens the sphincter. Again, the acid food passes out and the acid closes the sphincter to further passage until the duodenal changes finish their slower course.

Thus, automatically, carbohydrates would go early and quickly into the intestine to meet their proper ferment; and proteids, postponing the presence of free hydrochloric acid by uniting with it, would be retained in the stomach to suffer alternation by the gastric juice and only after such alternation be permitted to go on. Thus, the intestine would be saved from overwhelming discharges from the gastric reservoir; and by this same automatic mechanism the gastric secretion, harmful to the action of intestinal ferments, is rendered innocuous because of its admission, little by little, into the duodenum.

The Small Intestine. The small intestine is not only a region of digestion, but also a region of absorption. Throughout its length there are no sphincters. Peristalsis cannot act, therefore, to mix the food with the secretions or expose the digested food to the absorbing wall. The admirable process by which these functions are performed Cannon has termed "rhythmic segmentation." In the small intestine there are, then, two mechanical activities—rhythmic segmentation of the food, the most common activity, and peristalsis.

This process of rhythmic segmentation consists of contractions of circular fibres of the small intestine which occur in pairs, first in one place and then in another, pressing the food into sections and then breaking these up again, churning, as it were, the intestinal contents, but not moving them on. After this has lasted for a time a wave of peristalsis pushes the food down toward the large intestine.

By these segmenting movements the food is thoroughly mixed with the secretions of the liver and pancreas. These contractions must have a considerable effect in squeezing out secretion from the intestinal glands and stimulating their blood supply.

The Large Intestine. When the large intestine is full the material in the distal portion is usually composed of rather hard lumps, while that in the proximal portion is soft and of uniform consistency. The condition of the contents in these two regions indicates a division of the large intestine into two parts, and the mechanical activities of these two parts correspond to the differentiation. In the distal portion the material is slowly advanced by rings of tonic constriction. In the proximal portion the common movements are waves of constriction running backward toward the cæcum.

These waves of antiperistalsis work up against the structure which has always been spoken of as the ileocæcal valve. It seems probable, however, that the point where the small intestine enters the large one is equipped with a much more perfect valve mechanism than was formerly supposed. Indeed, the waves of antiperistalsis correspond so closely to the waves of contraction that work down upon the pylorus and appear to perform much the same function—namely, to mix the food more intimately with the intestinal juices—that it seems probable that the ileocæcal opening is equipped with a true sphincter. These antiperistaltic waves are of great value to the clinician, as it is by their action that nutritive enemas are retained and carried up to a point where absorption can take place. Cannon has proven by the use of the x-ray that small, mushy enemas are easily carried back along the large intestine by the antiperistaltic waves.

He has never seen small or mushy enemas carried back through the ileocæcal valve; but when large injections are given of the consistency of cream the waves of antiperistalsis may carry them into the small intestine.

With each new accession of food in the large intestine a strong tonic constriction of the cæcum and proximal colon occurs, which presses onward into the distal colon some of the contents of these parts. Antiperistaltic waves follow at once the tonic contraction, so that much of the food which has been pressed onward is returned toward the cæcum. With the repetition of this process, however, more and more material accumulates in the distal colon until finally a persistent ring of contraction separates this material from the region of antiperistalsis; as still more food appears in the large intestine this ring moves slowly onward toward the rectum, pressing the mass before it, and is followed by other similar rings carrying onward similar masses by very slow peristalsis. The masses of waste material thus advanced accumulate in the lower part of the distal colon and are ultimately passed from the body in the act of defecation.

In the cat defecation is preceded by the disappearance of the slowly moving peristaltic rings in the lower part of the distal colon and the appearance of a strong, broad constriction near the beginning of this region. The band of constriction is then drawn downward by a shortening of the longitudinal muscles. Thereupon, the constriction which divides the lumen moves slowly along and, with the aid of the voluntary abdominal muscles, pushes the separated mass through the relaxed sphincters out of the canal.

Inhibition of the Movements of the Alimentary Canal during Emotions. Observations on the cat, made in the Harvard Physiological Laboratories in 1898, showed that gastric peristalsis is stopped whenever the animal manifests signs of rage, distress, or even anxiety. With the similarity between the extrinsic innervation of the stomach and that of the intestinal tract, it was of interest to note that emotional states have the same effect on movements of the intestines that they have on movements of the stomach. Any signs of emotional disturbance, even restlessness and continued mewing, which indicate, perhaps, uneasiness and discomfort, were accompanied by total cessation of segmenting movements in the small intestine and antiperistalsis in the proximal colon, as well as complete quiescence of the gastric mechanism. Evidently chemical factors of digestion can have little importance, if fears and worry prevent the delivery of the food to regions of active digestion and absorption.

Pericolitis Sinistra. Sigmoiditis. The possibility of the existence of acute inflammation of the walls of the descending colon and sigmoid flexure with involvement of their peritoneal covering has been recognized for some few years past. The condition gives symptoms similar to appendicitis except that they occur upon the left side, although pathologically it is more nearly analogous to perityphlitis.

Reference was made to the subject by Hemmeter in PROGRESSIVE MEDICINE, December, 1903, p. 44, in which he mentioned the work of Mayor and Bittorf as well as his own.

Since then the subject has excited considerable interest and numerous cases of localized inflammation of the left colon and its peritoneum, sometimes with abscess, have been reported.

Two communications by Rolleston[1] and Rosenheim[2] have been published during the past year, that of Rolleston's being particularly valuable. Like inflammation in the right iliac fossa, left-sided colitis may give rise to a number of conditions. Thus there may be: 1. Local peritonitis of comparatively slight intensity about the descending colon or sigmoid flexure. 2. A local abscess connected with the focus of original inflammation. 3. The rupture of such an abscess may cause a general peritonitis.

The clinical manifestations are as follows: There is a period of constipation which is followed by pain in the left pelvis, accompanied by fever, and perhaps by vomiting. On palpation there is some tenderness and usually a sausage-shaped tumor in the left iliac fossa. Leukocytosis has been noted in some cases.

The treatment of this milder form of the condition is to promptly relieve the constipation by enemas and purgatives. Cold locally may help the pain.

The inflammation may be and probably is usually caused by fecal accumulation. Occasionally it appears to commence in a diverticulum of the large bowel, as in cases reported by Rolleston. The inflammation may be localized in one or more epiploic appendages, as in cases reported by Rixford[3] and Bland-Sutton.[4]

When the inflammatory process goes on to suppuration the abscess spreads itself up and down along the bowel. It may break into the colon, and has been known to burst into the urinary bladder. The physical signs of such an abscess are apt to be indefinite and, unless the case has been followed from the onset, are usually mistaken for malignant disease.

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[1] Lancet, 1905, p. 854.

[2] Zeitschrift f. klinische Medizin, Bd. liv., Nos. 5 and 6.

[3] California State Journal of Medicine, October, 1904, p. 296.

[4] PROGRESSIVE MEDICINE, December, 1904, p. 128.

If the presence of a collection of pus is reasonably certain it should be opened.

Rolleston reports a case of general peritonitis due to the rupture of such an abscess. Stercoral ulcers may rupture directly into the general peritoneal cavity without the formation of pus, as in a case of my own where the rupture occurred in false diverticula of the sigmoid flexure.

Ptosis of the Abdominal Aorta. Stifler[1] says the dragging upon the connective tissue of the retroperitoneal space produced by the displacement of the various abdominal viscera may finally bring about ptosis of the abdominal aorta itself. When this occurs it is probable that the aortic displacement is responsible for some part of the complicated symptom-complex which is seen in general enteroptosis. The aorta may be affected in two ways: First, it may be associated with dilatation in the portion of the vessel lying below the transverse mesocolon. It may be enlarged to twice its usual size and can be plainly palpated two fingers' breadth above the navel, sometimes even higher. The aorta is quite firmly connected with the pancreas directly and with the duodenum indirectly through the hepatoduodenal ligament, and in general abdominal ptosis the long-continued dragging upon the aorta by these fibrous bands causes dilatation and displacement. Second, the contraction variety where the vessel is narrow and thickened and elongated. It can be palpated through the abdominal wall through its whole length as a hard, tortuous cord, pulsating and tender. The thickening is without doubt inflammatory and it is due to irritation spreading from the peritoneum in various inflammatory conditions, as gastric ulcer, appendicitis, and paranephritis and perinephritis. In both forms there is usually a systolic thrill and bruit. It would be expected that such interference with the aorta would give rise to decided reflex disturbance, and there is little doubt that it does. However, its part in the symptomatology of enteroptosis will not be determined until we have a more definite understanding of the reflex disturbances produced by this complicated condition. The cases of marked ptosis and enlargement of the aorta reported by Stifler seem to be of the type of general enteroptosis that have considerable pain about the centre of the abdomen. Stifler calls this pain "sympatheticismus," and it may be that it is produced by interference with the sympathetic supply of the aorta and its branches. One very distinctive symptom of ptosis of the aorta is the extreme pulsation of the vessel so that the patient complains of an abdominal heart or two hearts. From what has been said it will be seen that displacement of the aorta always occurs in connection with the displacement of one or more of the abdominal viscera, and consequently the predisposing causes of aortic ptosis are the same as those of enteroptosis in general. However, the development of aortic displacement is especially favored by the improper treatment of floating kidney by badly fitting bandages or belts. Properly fitting abdominal support to relieve the traction and irritation of the aorta is the best method of treatment. Fixation of a movable kidney has had good results in several cases. The best methods of treatment are those directed to the relief of enteroptosis as far as possible, such as diet, hydrotherapy, and rest.

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[1] Berliner klin. Wochenschrift, 1904, Bd. xli., No. 36.

Treatment of Tape-worm. Boas[1] says that in his large experience fluid extract of *filix mas* has proven by far the most reliable and least toxic of all tape-worm remedies. He has never had a failure nor a case of poisoning. He thinks, however, that the cause of his success lies not so much in the remedy as in the technique of its administration. He lays very little importance upon the preliminary fasting and purging that are usually thought to be necessary. Indeed, the period of abstention from food may increase the danger of intoxication with the drug. The method of the administration of the vermifuge is very much more important than preliminary treatment.

Boas has found that he obtains equally as good results with small doses as with larger ones, and rarely gives more than 5 to 8 gm. of the extract for adults. The best form of administration is in a thin emulsion with gum arabic. This rarely causes vomiting, and even when it does it is so much the best way to give it that a hypodermic of morphine is warranted to ensure retention in obstinate cases. If the drug is given in capsule, both capsule and extract must be absolutely fresh.

Boas administers the dose in the morning, and then gives no food or drink at least for six hours, so that the drug is not diluted and exerts its full effect upon the worm. At the end of the period a purge must be given, preferably some saline or some bitter water. Oil must be avoided, as it increases the solubility of the drug and increases the tendency to poisoning. The important part of the treatment is the prolonged period of fasting after the filix mas is administered and before the purge is given. If this is insisted upon, then smaller doses of the drug are quite as efficient as larger ones and toxicity is avoided.

Boas reports a typical case as an illustration of his method. A German lieutenant had acquired a tape-worm in South Africa and had undergone three unsuccessful attempts at removal with large doses of extract of filix mas, which had produced decided toxic symptoms. The patient presented himself at Boas' private clinic at eight o'clock in the morning, without preliminary treatment. He was given 8 gm. extract of filix mas in emulsion. Seven hours later he took two glasses of Apenta water and no food or drink in the interval. At six o'clock in the evening he passed a thin stool with the worm intact. He was then encouraged to eat freely and suffered no unpleasant results.

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[1] Therapeutische Monatshefte, December, 1904, Bd. xviii.

The Entrance of the Larvæ of Ankylostoma through the Skin. Fritz Schaudinn[1] has confirmed the experiments of Looss, which have shown without much doubt that the larvæ of ankylostoma may enter the intestine through the skin. Schaudinn's experiments were carried out with monkeys. A watery solution of the stool containing ankylostoma was spread upon the back, after shaving, and allowed to dry there. Infection was entirely successful, and when the animals died large numbers of ankylostoma were found in their intestines. Professor Looss showed his preparations during the Zoological Congress in Bern, August, 1904, illustrating the method of passage of the ankylostoma larvæ from the skin to the intestine in dogs. The larvæ enter into the veins of the skin, then go through the right heart into the capillaries of the lung, then into the alveoli and wander through the bronchi, trachea, larynx, œsophagus, and into the intestine. A portion of the larvæ go into the lymph system and then finally into the veins, although some lodge in the lymph glands. Professor Looss has demonstrated every stage of these complicated procedures while in preparation. Schaudinn himself found five larvæ in the heart blood and several in the lungs of the monkeys he inoculated. He says that in his opinion the entrance of ankylostoma through the skin is no longer susceptible of doubt.

"Anæmia in Porto Rico." Uncinariasis. The appearance of the admirable monograph by Ashford, King, and Igaravidez, which constitutes the report of the Porto Rico Anæmia Commission, marks an era in the study of hook-worm disease in America.[2] Their preliminary notes were quite fully reviewed in PROGRESSIVE MEDICINE, December, 1904, and in this volume is the full report.

From the establishment of their field hospitals, April 30 to August 15, 1904, no less than 5490 cases were treated for uncinariasis. Of these 1029 could not be followed long enough to definitely determine the result. Of the remaining 4500 cases 59 per cent. were cured, 2 per cent. were not improved, and less than 0.5 per cent. died, while the remaining 40 per cent. were improved.

Besides saving thousands of lives the material observed has been carefully studied and analyzed. Altogether the report is a credit to

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[1] Deutsche med. Wochenschrift, 1904, Bd. xxx., No. 37.

[2] Ashford, King, and Igaravidez, Anæmia in Porto Rico, Porto Rico, 1904.

American medicine, and takes rank with the work of the Yellow Fever Commission in Cuba.

The main results of the investigation of the Commission are that the anæmia which affects 90 per cent. of the rural population of Porto Rico is due to the hook-worm, and that in the great majority of the cases the disease is curable.

TREATMENT OF UNCINARIASIS. The Anæmia Commission say, as a result of their large experience, that there are only three drugs worthy of serious mention—thymol, male fern, and beta-naphthol.

Thymol is preferred to male fern in America and England. The Commission used it in the majority of their successful cases. Toward the end of their work beta-naphthol was found so successful that it bade fair to take the place of all other remedies.

The method of administration of the thymol was as follows: In the evening a dose of either magnesium or sodium sulphate was given; usually an ounce was sufficient, and, as a rule, this amount ought not to be exceeded, as too much salts may produce an exhaustive diarrhœa. The object to be obtained is the emptying of the bowels so that the anthelmintic will act upon an exposed mucous membrane. On the next day the patient is kept in bed without food and is given 30 grains of finely powdered thymol in capsules at 8 A.M., and at 10 A.M. the dose is repeated. At 12 M. another purge of salts is taken.

All solvents of the thymol must be avoided while the drug is in the intestinal tract, such as alcohol, ether, glycerin, turpentine, chloroform, and oils. The Commission say that, in their opinion, the danger of the drug has been greatly exaggerated, and they think it is exceedingly inoffensive if solvents are avoided and the drug is properly given.

It is contraindicated in great debility, very old age, pregnancy, advanced cardiac or other organic disease, anasarca, a tendency to vomiting and diarrhœa, and in dysentery, although the imminence of the danger from the hook-worm may even demand its use in these conditions. Under such circumstances the dose should be modified and reduced one-half or more.

Nothing in their experience indicated that the *Uncinaria americana* was any easier to expel than the old world parasite.

Except in debilitated cases the thymol was repeated once a week until the ova were absent for a period of several weeks, as investigation showed that the disease had periods of latency and that recurrences were common, either from revival of the parasites or reinfection.

Male fern is the favorite drug on the continent of Europe because it is thought to be less dangerous and more effective than thymol.

The Commission do not believe that it is less dangerous, and it is certainly as disagreeable to take, if not more so. However, they gave it in some cases where the parasites were resistant to thymol. It gave very good results in a part of the cases; in others it did not. It seemed to cause more dizziness and nausea, and patients generally complained that they felt sicker and weaker after its use.

Undoubtedly both drugs are useful, and a choice between them will depend upon circumstances and the preference of the physician. A change from one to the other is often very effective in obstinate cases.

Beta-naphthol. The credit of the discovery that this drug was a very useful anthelmintic in hook-worm disease belongs to Bentley.[1] He abandoned thymol two years before writing his article in favor of beta-naphthol.

The drug appears to be quite as valuable as thymol as an anthelmintic, is not as toxic, and costs one-tenth as much.

The Porto Rico Commission have employed it in a limited number of cases and confirm Bentley's statements as to its effectiveness.

A Specific Toxin Elaborated by the Dibothriocephalus Latus. The occurrence of cases of very severe anæmia due to the presence of the dibothriocephalus latus in the intestine of man suggests that there must be some toxic substance elaborated by the worm that has a hæmolytic action. The same may be said of the ankylostoma duodenale. This seems the only explanation for the severe anæmia which approaches the type termed pernicious, because such marked blood changes could not be caused by the loss of blood or the digestive disturbance occasioned by the parasites.

The supposition that a hæmolytic toxin was elaborated by the parasite was first confirmed by Tallquist and Schaumann, who produced a distinct anæmia in dogs by feeding them with the fresh tape-worms.

That this poison is specific is suggested by the work of Isaac and von den Velden,[2] who found that when an extract of the fresh proglottides of the dibothriocephalus latus was added to blood serum from a person harboring the worm an albuminous precipitate was obtained.

As confirmatory evidence that the precipitate was produced by some substance obtained from the dibothriocephalus, a rabbit was immunized with the worm extract. It was found that the rabbit's serum contained a substance which produced a precipitate with the worm extract in the dilution of 1: 1000.

These investigations throw much light upon the pathology of parasitism, for it can hardly be questioned that the dibothriocephalus at any rate produces an albuminous toxic substance that is specific and hæmolytic in its action.

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[1] Indian Medical Gazette, Calcutta, April, 1904.

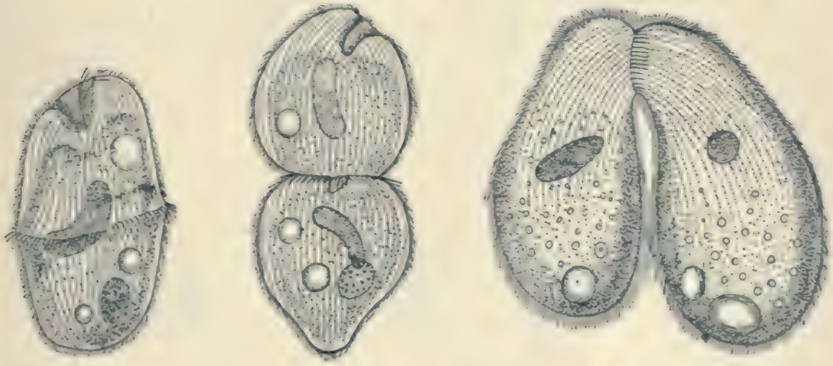
[2] Deutsche med. Wochenschrift, 1904, Bd. xxx., No. 27.

Perhaps the only weak point in the chain of evidence is that it is not proven by these experiments that the toxin is produced during the life of the worm and is not a necrobiotic change. However, the theory of a specific toxin clears up many of the points in the symptomatology of different parasites that have up to this time been obscure.

Balantidium Coli. Another form of intestinal parasite in man is the balantidium coli, of which a case has been recently reported by Koslowsky.[1] This parasite, it will be remembered, is a protozoon that seems almost certainly to bear some etiological relation to certain forms of diarrhœa. It is a common inhabitant of the intestine of the hog, where it is harmless. It is supposed that the protozoa are transferred to man in sausages.

The parasite is of oval shape, 60 to 100 microns long and 50 to 70 broad, and is covered with ciliæ that are in rapid motion when the organism is alive. Ectosarc and endosarc are sharply differentiated. The endosarc is granular and contains a kidney-shaped nucleus, generally two contractile vacuoles and granular detritus. Motion is so rapid that it cannot be followed under the microscope. The protozoon dies very quickly and undergoes fragmentation. (Fig. 4.)

FIG. 4



Balantidium coli. 1 and 2. Stages of division. 3. Conjugation. (After LEUCKART.)

Koslowsky thinks that the parasite occurs oftener in man than appears in the literature. Its presence is hard to detect, since it is very easily overlooked in the feces and indeed is not at all constantly present in the discharge from the bowel.

In Koslowsky's case the infection by balantidium was a complication and not the cause of death. The patient had had a diarrhœa for several years and the parasites had been found in the feces. Death ensued from general tuberculosis. Autopsy showed the usual lesion of balantidium infection, namely, ulcers in the rectum and large bowel, with undermined edges.

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[1] Archiv f. Verdauungskrankheiten, 1905, Bd. xi., part i.

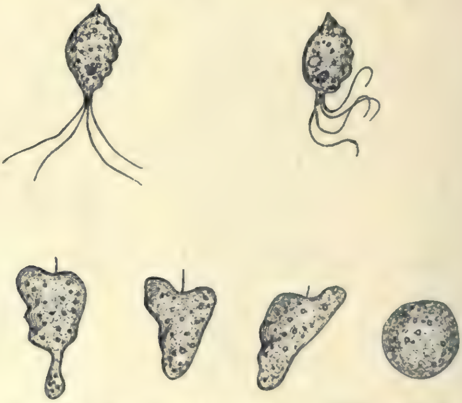
There is usually widespread catarrhal inflammation beside the ulceration.

Numerous balantidiums were found in the mucosa and submucosa, but not in the lumen of the veins.

The symptoms of the condition are obstinate diarrhœa, sometimes with pain and mucus, pus and blood in the stools. Anæmia, emaciation, and a general cachexia may ensue in severe cases.

The treatment is directed toward the removal of the parasites and the checking of the diarrhœa. Enematas of acetic acid, carbolic acid, iodine, and opium have been employed.

FIG. 5



Cercomonas coli hominis. (After MAY, from MOSLER.)

Flores cinæ, filix mas, calomel, and keratinized quinine pills are some of the vermifuges given by the mouth. Tanalbin and bismuth in large doses may be used for the diarrhœa.

Rectal Feeding. Edsall and Miller[1] conclude that it seems possible that some method of preparation of nutritive enematas may be devised which will permit of the absorption of a varying amount of food having a value in calories of 500 to 700. According to recent investigations this would be enough in some cases to prevent loss of weight for a considerable time, but whether this means normal nutrition is still doubtful. At any rate, as Edsall[2] has previously shown, nutritive enematas are rarely absorbed sufficiently to give even this food value. The most valuable functions served by rectal feeding at present are, first, and most important, to provide fluid and various inorganic salts for the tissues; second, to

[1] American Medicine, 1905, February 4th.

[2] University Medical Magazine, March, 1900.

furnish a certain fraction of the requisite amount of food needed by the organism, perhaps a third to a sixth; third, for the psychical effect upon the patient and his friends. Edsall and Miller think it doubtful whether the amount of actual food provided will ever be increased by improved methods of preparation or administration to the point where it will be possible to prevent actual tissue loss. The occasional cases in which nutrition seems well sustained or improved entirely by rectal feeding cannot properly be used as examples of what can be expected from nutritive enemata. The results obtained in these cases are best explained by the occurrence of reverse peristalsis in the large intestine, which carries the food up into the absorptive portion of the colon and sometimes well past the ileocæcal valve. The form of food apparently most imperfectly absorbed is fat. This is unfortunate, because fat provides twice as much energy for the organism as the same amount of either proteids or carbohydrates. With the purpose of providing fat in an easily assimilable form Edsall and Miller have carried out a series of investigations to determine: first, whether fats in the form of soap could be easily prepared and administered, and what their nutritive value is when given by the bowel; second, whether a good emulsion of fat could be obtained that would stay emulsified after its introduction into the bowel, and what was its food value. The experiments with soap were carried out with special soap prepared in their laboratory, and as little irritating as it was possible to make it. Even then it proved too irritating to be used as a rectal food, and besides it was irregularly and not very perfectly absorbed. They succeeded in obtaining a good fat emulsion by taking the white of nine eggs and an equal amount of 0.5 per cent. sodium carbonate solution, heating them together upon the water-bath, adding cod-liver oil and shaking thoroughly for five minutes. The preparation so made remained in excellent emulsion after its introduction into the bowel. The amount of fat absorbed was considerable, and it was higher than that absorbed from the mixture of milk and egg; indeed, it was more than was formerly believed possible by some observers. Their results in these experiments offer some encouragement for further attempts to improve the methods of rectal alimentation.

In discussing the relative value of carbohydrates and albumin in nutritive enema, Reach[1] says that carbohydrates are superior and dextrine especially valuable. Alcohol has also a place in this form of feeding.

Enterokinase. An "Activating" Enzyme. One of the most interesting recent advances in the physiological chemistry of the intestine is the discovery of a substance secreted by the intestinal glands which has the power of activating or increasing the power of trypsin. This substance is a peculiar enzyme, which has been called enterokinase.

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[1] Centralblatt f. der Grenzgebiete, 1904, Bd. vii., Nos. 8, 9.

It has the power of greatly increasing the power of trypsin, indeed, it is probable that trypsin is not active unless enterokinase is present.

Glaesner[1] has confirmed in man the original observation concerning this activating enzyme which was made on dogs. He obtained pancreatic juice directly from a fistula and showed that it contained no preformed trypsin, but could be activated by intestinal extracts. Hamburger and Hekma[2] found enterokinase in human succus entericus. The amyolytic and lipolytic enzymes of the intestinal juice apparently need no activating.

The subject is full of interesting possibilities, quite as important from the clinical as from the purely scientific standpoint. Thus, digestion of muscle fibre which we have thought to be dependent upon trypsin may be imperfect, not because the function of the pancreas is disturbed, but because the intestinal secretion is deficient. This adds to the difficulty that has always been encountered in devising a method of measuring the activity of pancreatic digestion.

Action of Various Drugs upon Intestinal Movement. Ott and Ulman suspended a piece of the small intestine of a cat in a glass full of a salt solution, through which oxygen was kept streaming at body temperature. The lower end of the piece of bowel was attached to the lever of a registering apparatus, and the substances to be experimented upon were then dropped into the fluid.

Their experiments have a very interesting bearing upon the therapeutic and physiological effect of the substances used.

Adrenalin contracted the arterioles, but relaxed the longitudinal fibres and stopped the pendulum movement.

Extract of spleen increased and pancreas decreased the intestinal movement. Extract of other organs had no marked effect.

In confirmation of MacCallum's investigations referred to in PROGRESSIVE MEDICINE, December, 1904, Ott and Ulman found that small amounts of sodium citrate increased the force of peristaltic movements, while when calcium chloride was added the muscle relaxed and the contractions became weaker, slower, and irregular.

This is an observation of considerable therapeutic value. I have used calcium chloride in amounts of 10 grains to 1 pint of normal salt solution when giving the latter by the bowel, and am certain that it has considerable power in aiding in its retention.

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[1] Zeitschrift f. physiologische Chemie, 1904, Bd. xl. p. 465.

[2] Journal de physiologie, 1902, iv. 5.

Ott and Ulman found that atropine relaxed spasm and increased the force of the contraction.

Eserine produced a rapid tetanic contraction. Pilocarpine had somewhat the same action. Strychnine increased contraction, while nicotine produced a sudden tetanic contraction followed by a slow relaxation.

A very interesting part of the investigations showed that products of proteid digestion are active stimulants to peristalsis. Thus, a good digestion would predispose to regularity in the evacuation of the bowels, and is one reason why constipation occurs in dyspeptics.

THE LIVER.

The Stools in Disturbance of the Liver Function. Obstruction to the entrance of bile into the intestine is accompanied by light or whitish stools, and the absence of bile can be demonstrated by the failure of color reaction with the sublimate test.[1] There is, however, an exception to this rule in the so-called "acholic stool without icterus" when the stool is white, but where there are no other evidences of biliary obstruction. Nothnagel, who first described this condition, ascribed it to a functional hyposecretion of the liver, but later agreed with von Jaksch and von Fleischer that such absence of color of the feces is caused either by insufficient fat absorption or a reduction of the hydrobilirubin into a colorless substance (leukohydrobilirubin). In the latter case the surface of the stool turns brown on standing in the air, while in fatty stools the brown color appears after extracting with ether.

The sublimate test is a reliable means of detecting these pseudoacholic stools, giving the reaction for hydrobilirubin unless the stool is not fresh when examined or has undergone a great deal of fermentation in the bowel.

The most important symptom of biliary obstruction is insufficient fat absorption, which may reach such a degree that 25 per cent. to 50 per cent. of the ingested fat is found in the stool. The reason for this well-recognized fact is still not determined. It is hard to see why the pancreas has not the power of caring for this extra fat, especially as it is known now that some fat splitting takes place in the stomach. Probably the bile furnishes some stimulation to the intestinal epithelium, aiding absorption.

Absence of Putrefaction in the Feces in Jaundice. Schmidt says that the old statement which is sometimes found in recent text-books, that intestinal putrefaction is increased when bile is absent is entirely wrong.

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[1] Adolph Schmidt, loc. cit.

Bile undoubtedly has some antiseptic properties and the ethereal sulphates are increased in the urine in jaundice, but the more reliable methods of measuring the amount of intestinal putrefaction and of estimating the intestinal bacteria (Strasburger) show that putrefactive changes in the stool are really less than normal when bile is absent. The reaction of such stools is always acid, but that is due to the fatty acids present and not to fermentation.

The reason for this lack of putrefaction is found in the large proportion of fat in the stools of jaundice. Fat does not putrefy, as does the albumin in feces from cases of pancreatic insufficiency, and consequently foul stools are a symptom of not liver disease but of insufficient albumin digestion such as is present in pancreatic disease. Consequently, jaundice does not lead to enteritis, as does disease of the pancreas, and bile may be absent for long periods of time without intestinal irritation. Schmidt contradicts another old-received idea that jaundice is apt to be accompanied by constipation. He says that the stools are large and free and come with the normal "period of passage" on account of their large percentage of fat. These observations have been confirmed by Boas, who explains the absence of constipation by the gently stimulating action of the excessive amount of fatty acids. Schmidt remarks that this throws an interesting light upon the treatment of chronic constipation by increasing the fat of the diet.

Febrile Syphilis of the Gall-bladder Ducts and Liver. Riedel calls attention to the existence of a form of syphilis of the liver, gall-bladder, and bile-ducts that runs a febrile course, is accompanied by pain, and closely resembling gallstone colic. The differential diagnosis is extremely difficult in all cases and is complicated by the fact that this form of syphilis of the gall-bladder and liver may or may not be accompanied by jaundice and may occur with high fever but without pain, just as gallstones may be without jaundice and pain.

In syphilis of the liver and gall-bladder with pain there are usually adhesions between the bladder and surrounding organs, and the pain may often be due to that cause, although Riedel cites one case in which there was exquisite suffering, and operation showed diffuse lues of the liver alone without involvement of the gall-bladder. Riedel's attention was first called to the condition ten years ago when he had an opportunity of observing a case that presented the typical clinical picture of cholecystitis from a gallstone impacted in the neck of the gall-bladder. Operation showed nothing in the gall-bladder but a little thick bile, but there were thick adhesions connecting the tip of the gall-bladder with the neighboring organs, and fresh deposits of fibrin upon the surface of the liver and gall-bladder indicating an acute inflammation. The liver contained a number of grayish nodules that were undoubtedly syphilitic.

The patient recovered entirely under the administration of potassium iodide. In two other cases Riedel recognized the luetic character of the symptoms, but the pain was so intense that he operated and found diffuse adhesions between the gall-bladder and the duodenum.

In still another case with pain in which he diagnosed syphilitic hepatitis and cholecystitis he refused operation, but the patient (a physician) insisted and the laparotomy revealed syphilis of the liver, but without cholecystitis and without adhesions.

Three of his cases had persistent fever lasting over a long period of time resembling a hectic temperature, but, as the subsequent course of the case showed, without pus. The fever was apparently due to the tertiary syphilitic infection and was of the type first described in this country by Musser, and which I myself have come to regard as a definite symptom of tertiary syphilis. It has been present to some extent in every one of the cases of hepatic syphilis that have come under my observation.

Riedel has seen and recognized many cases of liver syphilis since his first experience. He naturally did not operate upon them and of course could not give the exact condition of the liver, but all were benefited by potassium iodide.

The interesting and important point in his series was the great similarity that the condition bore to gallstone cholecystitis and sometimes to malignant growth.

In his subsequent experience only one case had fever. The condition occurs generally in the well-to-do, and the patients have wandered from doctor to doctor until the true character of their affection was recognized, and they recovered under antisyphilitic treatment. One of his patients had been under treatment for an inoperable gastric carcinoma, but was entirely relieved by six bottles of potassium iodide.

Whether a diagnosis is made of syphilis of the gall-bladder or of the liver, antispecific treatment is indicated in both cases and operation is to be considered only when the pain is not relieved by mercury or iodides and the presence of adhesions is suspected. Even then the possibility of great pain being produced by syphilis of the liver alone must be remembered.

ACUTE PRIMARY CHOLECYSTITIS. A much more important point is the diagnosis between acute cholecystitis without stone and syphilitic cholecystitis. Riedel is of the opinion that generally primary cholecystitis is a mild affection, and does not call for surgical interference. He bases this opinion upon the large number of cases in which adhesions are found at operation or autopsy, around the gall-bladder, saying that it is not likely that all such adhesions could be explained by the inflammation produced by a gallstone which had passed out *per vias naturales*.

He has seen one case, however, of acute gangrenous cholecystitis in which only prompt operation saved the child's life, and it is important not to overlook the existence of this form in the differential diagnosis of inflammation of the gall-bladder.

It must not be forgotten in attempting to determine whether or not a cholecystitis or hepatitis is syphilitic, that gallstones, a primary pyogenic cholecystitis, or an aberrant form of appendicitis may occur quite independently in a patient with the history of syphilis, indeed with acute syphilitic manifestations in other parts of his body.

Menstrual Jaundice. The so-called menstrual jaundice first reported by Senator in 1872 is extremely rare. Indeed, since Senator's report of four cases no other instance of the condition has appeared in literature until Metzger's case in 1904.[1] The patient was a woman aged forty-five years, whose menses had begun to be irregular and whose condition suggested the onset of the climateric differing in this respect from the cases reported by Senator, whose patients were all young women with regular periods. In Metzger's case there was epigastric tenderness, sharp attack of pain in the epigastrium, and jaundice which had lasted for three weeks, when the woman first came under observation. The liver was tender but was not enlarged.

The symptoms were so severe that an exploratory operation was seriously considered. A few days later the pain and jaundice had entirely disappeared. Continued observation showed that the pain and jaundice reappeared with every menstruation, and it was evident that there was some close relation between the two conditions.

Various explanations for menstrual jaundice have been offered. Quincke suggests that it is due to hepatic congestion, but in Metzger's case the liver was not enlarged, rendering the supposition that the liver was congested improbable. Metzger believes that in some individuals menstruation is accompanied by contraction of the ducts preventing the outflow of bile.

Ascardiasis of the Biliary Passages. The long worm has considerable power of forcing itself through narrow passages, and cases of jaundice have often been reported where the cause of the biliary obstruction was thought to be the entrance of the parasite into the common duct. However autopsies which confirmed the possibility of the occurrence have been comparatively rare. Vierordt[2] reports a case of a two-year-old child with jaundice, diarrhœa, fever, and vomiting and passing of worms. When seen two months after the onset of symptoms the abdomen was swollen and there was tenderness over the liver, which was enlarged and painful. There was no eosinophilia or leukocytosis. Soon a hard, movable tumor was discovered in the left hypochondrium which was thought (and rightly so, as it proved) to be the enlarged head of the pancreas. The clinical picture suggested an ascaris abscess of the liver and ascarides in the biliary passage and pancreatic duct.

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[1] Zeitschrift f. klin. Medizin, 1904, Bd. liii., p. 149.

[2] Samml. klin. Vortrage, June, 1904.

Operation showed two furuncle-like spots upon the under surface of the liver, but no pus was obtained. Death occurred shortly afterward. Autopsy showed ascarides in the common and hepatic ducts, which were enormously dilated and occluded with worms. The smaller ducts in the liver itself were dilated and surrounded by necrotic liver substance. The pancreatic duct was also occluded and the substance of that organ showed considerable necrosis.

Ebstein[1] recently reported the case of a woman who suffered from symptoms of biliary obstruction and infection until she passed several worms, one of which showed a deep constriction near its head, as if it had been lodged in a narrow canal.

The patient recovered completely and had no recurrence.

In a case reported by Pond[2] there were attacks resembling gallstone colic with jaundice and an enlarged and tender liver. There was no fever. The passage of worms suggested the real source of the trouble, which had been diagnosed as gallstones. After an anthelmintic the patient recovered completely.

Disinfection of the Biliary Passages. In PROGRESSIVE MEDICINE for December, 1904, I referred to a paper by Kuhn in which it was suggested that it might be possible to disinfect the bile and biliary passages by the internal administration of drugs which were secreted through the liver.

Kuhn showed that salicylic acid, menthol, and thymol were the most efficient of the antiseptics suitable for this purpose.

Recently[3] he has proven experimentally that bile secreted during the internal administration of these three drugs ferments more slowly outside the body and to a less degree, depending upon the character and dose of the drug used. This antifermentative action needs a day or so for its establishment.

These last experiments of Kuhn show that salicylic acid and its salts are the most active agents in delaying biliary fermentation.

Since the appearance of Kuhn's first article a preparation of salicylic acid, with various oils, menthol, and thymol, has been put upon the market under a proprietary name. Sufficient time has not elapsed to thoroughly test the remedy clinically.

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[1] Deutsches Archiv f. klin. Medizin., 1904, Bd. lxxxi., Nos. 5 and 6.

[2] American Journal of the Medical Sciences, September, 1904.

[3] Münchener med. Wochenschrift, 1904, Bd. li., No. 33.

Personally, I have had the opportunity of observing a number of cases in which an attempt was made to disinfect the biliary passages by its use, and have not seen any benefit result. Possibly the cases were too far advanced to be influenced by such means, and that the remedy will give more positive results in earlier stages of infection of the bile-ducts, or as a preventive of infection in attacks of cholelithiasis.

Jaundice from Lactophenin. Laache[1] reports a series of 20 cases of rheumatic affections treated by lactophenin. Nine of these developed icterus after the administration of 27 gm. (300 grains). Bile was present in the urine in all the patients and absent from the stools in 7. However, in 2 cases the feces were colored by bile, showing that icterus from this cause is not necessarily of the obstructive type.

Intrahepatic Cholelithiasis. The formation of gallstones in the smaller branches of the hepatic ducts within the substance of the liver is a matter of considerable importance clinically as well as pathologically.

Such little calculi can be discharged into the bowel or can wander into the gall-bladder and there form foci for larger stones, or more important still, they may pass into the common duct and grow larger there.

Inflammatory changes in the liver tissue about the ducts usually develops in cases of any standing, a condition that simulates cholangitis of the larger ducts. The possibility that small stones may form in the intrahepatic duct and pass downward probably has much to do with the reappearance of gallstone symptoms in cases in which the gall-bladder has been opened and drained.

Beer[2] found cholelithiasis 72 times in 250 livers, and intrahepatic stones 6 times. There was closure of the duct and secondary cholangitis in all of these 6 cases. He explains the formation of the calculi by (1) obstruction to the flow of bile; (2) a primary cholangitis, and (3) some unknown factor, because the first two conditions are not always complicated by the formation of intrahepatic stones.

The Effect of the Carlsbad Cure upon Gallstone Disease. Link[3] has followed 263 cases of cholelithiasis through their stay at Carlsbad, making careful examinations at the beginning and end of the cure. He found that enlargements of the gall-bladder subsided in the majority of the cases. Enlargements of the liver were not affected in seven-ninths but were decidedly reduced in the other two-ninths. A decided beneficial result was noted in 91 per cent. of his series.

Cases with a very prolonged course, severe infection of the ducts, and chronic jaundice were not improved by the cure.

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[1] Deutsche med. Wochenschrift, 1904, xxx., No. 49.

[2] Archiv f. klin. Chirurgie, 1904, Bd. lxxiv. p. 115.

[3] Munchener med. Wochenschrift, 1904, Bd. li., No. 30.

Hypernephroma of the Liver. De Vecchi[1] describes a neoplasm of the liver consisting of tissue that was plainly suprarenal in type. Such tumors probably arise in some error in development and may be benign or malignant. Their structure resembles similar tumors in other organs.

Fatal Hemorrhage of the Portal Vein Associated with Chronic Cholangitis. Hausteens[2] reports the following case: The patient was a man aged forty-five years, who had had two attacks of gallstone colic with jaundice in the previous five years. He had suffered for four months with pain in the back and right side, disturbed digestion, jaundice, fever, and ascites. His abdomen was tapped and the operation was followed by the development of a large epigastric tumor. The patient died suddenly in collapse. The autopsy showed an abscess lying in a mass of firm adhesions between the hilum of the liver, duodenum, and pancreas. A branch of the portal vein had broken into this abscess cavity and from there into the duodenum. The bowel and stomach were filled with blood. The bursting of the vein was caused most likely by erosion from without produced by the abscess in the hilum of the liver, which was the result of a cholangitis.

THE PANCREAS.

The Diagnosis of Pancreatic Disease. If the pancreas is entirely removed experimentally in animals or if it is entirely destroyed in man (as in diabetes or occlusion of the duct) the following disturbances take place:

1. About one-half of the ingested albumin passes out in the stool and even a relatively great proportion of the ingested fat. 2. Emulsified fats are better digested than non-emulsified in contrast to fat digestion in achylia. 3. The significance of the amount of fat splitting is not always reliable as a symptom, since at least two other factors enter into this process, namely, the condition of the fat (whether emulsified or not) and the amount of fat splitting which has taken place in the stomach. 4. Digestion of carbohydrates is usually not affected. In cases of incomplete destruction of the pancreas, a condition that is much more common in man than complete lesions, no decided disturbance of the intestinal function takes place.

Experimentally when the smallest remnant of the gland is left in the body, intestinal digestion is not disturbed; in man also advanced interstitial pancreatitis in various degenerations and even complete closure of the duct of Wirsung may be present without symptoms of pancreatic insufficiency. Why this is so is not very clear.

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[1] Virchow's Archiv, 1904, vol. clxxvii. p. 133.

[2] Norsk Magazin f. Laegevidensk, August 8, 1904.

Probably the succus entericus assumes all of the starch digestion and much of the proteid. It is quite certain that succus entericus possesses proteolytic ferments of its own independent of the pancreatic juice and of bacterial action. The proteolytic action of the intestinal bacteria is well recognized, and it is quite certain that such bacterial action may account for a part of the digestion of proteids that takes place in the intestine even when pancreatic juice is absent, as has been demonstrated by several observers (Brucke and Busch). Hemmeter has shown, however, that extracts from fecal matter when thoroughly sterilized and proved sterile still possessed a remarkable proteolytic and amyolytic power, and later he found that when the duct of Wirsung was ligated a ferment could be extracted from the feces which converted fibrin into peptone in an alkaline medium (therefore not pepsin). Cohnheim[1] has found a ferment in the succus entericus that has a powerful effect upon proteoses and peptone, although it has no power to break up fibrin. He has named this *erepsin*. It may complete the digestion of fibrin when this is started by some other agent, possibly bacterial action.

Practically then we can assume that almost all of the pancreatic secretion may be eliminated from intestinal digestion without disturbances arising, and consequently the diagnosis of an incomplete lesion presents the greatest difficulty.

The Diagnosis of Complete Lesions of the Pancreas. In detecting complete pancreatic lesions we have the following data to guide us:

1. Bile is present in the stools.

2. The fat is generally (not always) present as neutral fat (drops under the microscope).

3. Muscle remnants are visible to the naked eye.

4. On account of the large amount of albumin there are considerable putrefactive changes. Consequently pancreatic indigestion is much more likely to produce secondary intestinal catarrh than closure of the bile-ducts, which, as has been said, may persist for years without inflammation of the bowel.

5. The glutoid capsule method of Sahli and the presence of muscle nuclei, as suggested by Schmidt, form together a fairly reliable method of detecting experimentally the absence of pancreatic secretion.

Sahli's Glutoid Capsule Test. Sahli uses the so-called glutoid capsule, which is made of gelatin, and which has been exposed to the action of formalin gas until it is so hardened that it can only be digested by trypsin and is not affected by gastric secretion. Such a capsule is filled with iodoform. As soon as it reaches the small bowel and is digested by the pancreatic juice iodine will appear in the saliva. The source of error in the method is that the hardening of the capsule is apt to be irregular and the gelatin may become so tough that it resists trypsin as well as pepsin. This would render a negative result of no value. However, if a prompt reaction takes place pancreatic secretion is present, and as a negative test for disease of the pancreas the method is of value. The glutoid capsules are hard to obtain in this country.

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[1] Zeitschrift f. physiolog. Chemie, Bd. xxxiii. p. 451.

Muscle Nuclei Method. It has been shown experimentally upon dogs that when the pancreas is entirely removed remnants of muscle fibre pass through in the stool with their nuclei undigested.[1] Schmidt and Hemmeter have made the same observation in man in cases of complete lesion of the pancreas.

Hemmeter[2] found muscle nuclei in one case of pancreatic cyst with closure of the duct of Wirsung, and in one of stenosis of the duct after cholelithiasis. Both patients recovered after operation and in a few weeks no nuclei could be found. This is a very interesting and important observation.

The method is as follows: Small pieces of slightly fibrous beef are prepared in cubes of 0.5 c.c. square and hardened for a short time in alcohol. These are tied up in little silk gauze nets and are soaked in fresh water some time before using. They are recovered from the stool by straining it with a Boas sieve or by washing it through a piece of gauze over a bucket. The pieces of meat are then examined for nuclei directly by teasing in acetic acid or in doubtful cases are hardened, embedded, cut, and stained.

This method is not ideal. The presence of nuclei are not always conclusive. Thus, in serious diarrhœa the meat may be swept through the bowel before the nuclei are digested in the interior of the pieces, and so as a general rule only those cases can be considered positive in which all the nuclei are intact. When the pieces remain in the bowel longer than twenty-four hours the bacterial action may digest some of the nuclei, so the time of passage should not be longer than that period.

When neither diarrhœa nor constipation interferes with the test the presence of all of the muscle nuclei strongly suggests a severe, probably complete, lesion of the pancreas. This test, which is of value when it is positive in combination with Sahli's, which is conclusive when it shows that there is no disease of the pancreas, forms a method that should enable us to diagnose complete pancreatic lesions.

Our investigation leaves us as far as ever from a method of detecting the lesser grades of pancreatic disease and functional disorders of secretion that are infinitely more important to detect than complete lesion.

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[1] Trallenfang. Inaug. Diss., Bonn, 1903.

[2] American Medicine, 1905, vol. ix., No. 10.

These attempts to diagnose pancreatic disease from study of the stools have so far proven of no value therapeutically. Still, the use of organotherapy in the form of the organ itself or of its extract (not of its secretions alone) may prove of value in well-established cases therapeutically and in doubtful ones may be of some assistance diagnostically.

Abnormal Stools in Pancreatic Disease. Ury and Alexander[1] have formulated what we may hope to determine concerning pancreatic secretion by the examination of the stools for fat. The normal limit of assimilation for fat must be always kept in mind. This may be quite high (7 to 10 per cent.), and the daily amount sometimes reaches 350 gm. of butter fat.

The amount of fat allowed must be measured and varied back and forth until the power of the organism to assimilate it is accurately determined.

The stools in pancreatic disease may be abnormal in three ways.

1. An increased amount of fat with diminished splitting.
2. An increased amount with normal splitting.
3. A normal amount with diminished splitting.

However the power of assimilation is, as a rule, diminished, and by varying the amount of fat allowed the patient, results of some value may often be determined provided the following conditions are present:

1. There should be no jaundice, as absence of bile may cause steatorrhœa.
2. The fat administered must not be emulsified.
3. There must not be diarrhœa, and if any is present it must be stopped by opium.
4. The digestibility of the fat administered must be considered. Thus, it has been determined that when the same amounts of stearin, mutton fat, and olive oil are ingested the loss in the feces of the first will be 86 to 91 per cent.; of the second, 7.4 to 9.15 per cent.; of the third, 2.3 per cent. (Hemmeter).

As in other methods of investigation of pancreatic disease there are many sources of error to confuse and discourage us. Steatorrhœa may occur in disease of the small intestine with diminished absorptive power, and fats may be diminished in the stools in diseases in which some pressure interferes with the flow of fat through the bowel, such as enlarged mesenteric glands or tuberculous peritonitis. On the other hand, there may be complete destruction of the pancreas or obstruction of its ducts, and yet perfect fat digestion.

The discharge of large quantities of liquid fat after a solid stool is perhaps more significant than any of the other conditions mentioned, and Ury and Alexander consider it almost pathognomonic of pancreatic disease. Another important symptom is the passage of a relatively large amount of solid feces.

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[1] Deutsche med. Wochenschrift, 1904, Bd. xxx., Nos. 36, 37.

Nobel has laid considerable stress upon an excess of putrefaction in disease of the pancreas, but Ury and Alexander found the aromatic oxyacids normal in their cases.

The Pancreatic Reaction in the Urine. The reaction devised by Cammidge and Robson,[1] from which so much was expected by its originators, has apparently not been very well received. No reference to it has appeared in medical literature during the past year.

I have used it occasionally in my laboratory at the Presbyterian Hospital and have followed it when employed in other hospitals. It does not appear to be as reliable as Cammidge and Robson hoped that it would be, and I am afraid in its present form will not be a very useful clinical method.

Chronic Pancreatic Degeneration in Arterial Sclerosis. Hoppe-Seyler[2] has studied the clinical and pathological features of arteriosclerotic diabetes and has investigated many cases with pronounced pancreatic changes.

These lesions are due to vascular changes, especially arterial sclerosis, which are followed by atrophy of the pancreas.

In diabetes the islands of Langerhans are especially affected, although the secretory epithelium is much degenerated also. Hoppe-Seyler has named the condition pancreatitis interstitialis angiosclerotica.

THE PERITONEUM.

Pseudoascites. Of the various conditions that may simulate free fluid in the peritoneal cavity perhaps the most difficult to distinguish from true ascites is the so-called pseudoascites in children described by Tobler.[3] The condition is produced by the presence of fluid in the distended small intestine with an elongated mesentery. This will cause dulness in the flank when the child is lying upon its back, which moves with changes of posture like free fluid and also gives a wave of fluctuation similar to true ascites.

The affection occurs in children, especially girls, between two and a half and nine years, and is characterized by irregular and recurrent attacks of diarrhœa which may last for months, while the abdomen gradually increases in size. Rachitis is frequently associated with the disease and it may be complicated during its course by tuberculosis of the bones and joints, enlarged lymphatic glands, and malnutrition. Usually there is no fever and few subjective symptoms except occasional abdominal pain. The abdomen is usually distended often to such an extent that the umbilicus is obliterated, the veins distended, and the skin shiny and thin. At other times, but more rarely, the abdomen is relaxed and doughy. Under these conditions a splashing in the intestines can sometimes be elicited. Undulation simulating true fluctuation can generally be detected under both conditions—namely, when the abdomen is distended, as well as when it is relaxed. This sense of fluctuation is most easily obtained when the abdomen is distended and the amount of fluid is considerable, as shown by a large symmetrical area of dulness. However, the impulse is not felt above the areas of dulness, as it sometimes is in true ascites.

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[1] Progressive Medicine, December, 1904, p. 114.

[2] Deutsches Archiv f. klin. Medizin., 1904, Bd. lxxxi. p. 119.

[3] Ibid., Bd. lxxx., Nos. 3 and 4.

The condition most likely to be confused with pseudoascites is chronic exudative peritonitis, especially of the tuberculous variety. In the latter there is fever and severe pain and a constant tendency to grow worse. While in pseudoascites the course is irregular and intermittent with exacerbations, the subjective symptoms are insignificant and the physical signs are variable. The character of the bowel movements are different in the two conditions. In tuberculous peritonitis the stools are thin, infrequent, and watery, while in pseudoascites they are large and frequent. The peritoneum is usually entirely uninvolved in pseudoascites.

Peritonitis following Tonsillitis. Inflammation of the peritoneum generally arises from extension of some infectious process in one of the abdominal viscera, but rarely it is a purely hæmatogenous infection. In the latter case it is metastatic in type and the bacteria are brought from some other part of the body.

Künzel[1] reports a case where the tonsils appeared to be the point of entrance of the infecting micro-organism. A woman, aged eighteen years, came into the hospital in an unconscious condition and died in three hours. The autopsy showed a purulent peritonitis. The only point of origin for the infection that could be discovered were the inflamed tonsils. The streptococcus pyogenes was found in the exudate, both in the peritoneal cavity and in the tonsils.

Künzel offers as an explanation for the selection of the peritoneum as the place for metastatic infection that there might have been a small amount of fluid in the peritoneal cavity that was a suitable medium for the growth of the bacteria. However that may be, the case shows that the peritoneum may be the seat of metastatic inflammation, and confirms what we knew before, that the tonsils are a favorite place for the entrance of bacteria into the blood stream.

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[1] Münchener med. Wochenschrift, 1904, Bd. li., No. 43.

GENITOURINARY DISEASES.

By WILLIAM T. BELFIELD, M.D.

THE KIDNEYS.

Three phases of renal surgery are in process of evolution: first, the determination of the functional activity of the separate kidneys by various methods—cryoscopy of the blood, of the urine, the elimination of colored substances, the use of the cystoscope and ureter catheter, the so-called bladder divisors or urine segregators, and various combinations of these separate methods.

The second phase of renal surgery requiring review is intimately associated with the first: namely, the proper status of nephrectomy, especially for tuberculosis of the kidney. The third is the determination of the value of the relief of intracapsular tension of the kidney, whether by decapsulation, division of the capsule, or nephrectomy, as a cure for the manifold lesions of the kidney and its pelvis comprised under the elastic designation "nephritis."

Determination of the Functional Activity of the Separate Kidneys. Nephrectomy for Tuberculosis. On the value of methods for this purpose the past year has furnished expressions from authoritative German, French, and American sources. It was one of the subjects for formal discussion at the meeting of the German Surgical Society and later of the French Urological Association. At the former meeting the debate was opened by Rovsing,[1] by appointment. He stated emphatically his repudiation of urine separators of all kinds, and was equally emphatic in his testimony as to the value of the cystoscope and ureter catheter, to whose employment he ascribes the great improvement in his operative results, such as the reduction of the mortality after his nephrectomies from 13 to 3.3 per cent.; not a single death has occurred from insufficiency of the unoperated kidney since he began the use of the ureter catheter as a preliminary precaution

His opinions are based upon 112 nephrectomies personally performed and observed after operation. His analysis of renal tuberculosis proceeds in this way: having determined by the ureter catheter that the other kidney is healthy, he asks how extensive must the tuberculous process be in the kidney under examination to warrant its extirpation? Some surgeons, including Israel, rely upon the proven possibility that small tuberculous foci in the kidney may heal under hygienic treatment, and abstain from operation in such cases. Others, like Küster, remove the diseased parts by resection when these foci are small. Rovsing belongs to the much larger group of surgeons who think that every tuberculous kidney should be removed, provided its fellow is healthy.

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[1] Archiv f. klin. Chirurgie, Bd. lxxvii., Heft 1.

TREATMENT OF VESICAL TUBERCULOSIS. The second preliminary question is, Does the spread of the tuberculous process to the bladder constitute a contraindication to nephrectomy? Formerly his answer was no, if the bladder lesions were small; yes, if they were large. For he has in five cases seen small tuberculous foci of the bladder heal spontaneously after the removal of the kidney which contained the infecting focus; while in all cases of extensive bladder tuberculosis secondary to renal infection, the patients formerly died of exhaustion sooner or later after the removal of the kidney, in spite of Roentgen rays, the Finsen light, pyrogallic acid, sublimate injections, etc.

Latterly, however, he has learned to cure these vesical infections; he injects 100 c.c. of a 5 per cent. *watery solution of carbolic acid,* warmed to 38° C. (100° F.), into the bladder; five minutes later this is removed by catheter and a second similar injection is made. The injection is repeated two or three times until the solution returns free from turbidity. This treatment is repeated every second day, until the urine becomes clear and the cystoscope shows that the ulcers are healed. Surprisingly soon—after within two or three weeks—these ulcers are replaced by smooth scars.

These successes have extended the scope of nephrectomy in his hands for the cure of urinary tuberculosis; since he no longer considers bladder tuberculosis, however extensive, a contraindication to the operation.

Of 47 cases in which nephrectomy was done for renal tuberculosis, 23 had bladder infection also. In 5 of these the vesical infection was mild and healed spontaneously; in 18 it was extensive. In the first 7 of these he endeavored to cure the vesical disease by injections of sublimate and pyrogallic acid solutions, curetting, the x-ray, and other means without success; everyone of the 7 patients died sooner or later of the disease. The remaining 11 patients were treated with carbolic acid injections as above described; 10 of these were definitely healed and the eleventh greatly improved.

SIGNIFICANCE OF GENITAL TUBERCULOSIS. The important question, Does genital tuberculosis contraindicate nephrectomy for the kidney infection? Rovsing answers distinctly in the negative. Of his 47 nephrectomies, 24 subjects were men, of whom 10 presented tuberculosis of the genitals also, 4 bilateral. In these 10 he removed the epididymes or testes at the time of the nephrectomy. One died after the operation—the autopsy showing extensive disease of the second kidney, the ureter catheter being at that time but little used; the remaining nine patients are entirely well, though three of them had tuberculosis of the bladder, as well as of the kidney and the testicle.

THE VALUE OF CRYOSCOPY. Rovsing considers cryoscopy of the urine as well as of the blood entirely unreliable; he has seen the urine freeze at the normal point, although there was advanced disease of both kidneys; and, conversely, urine from normal kidneys has been observed to show an abnormally low freezing point.

VALUE OF EXCRETION TESTS. As methylene blue and indigo-carmine easily filter through certain diseased kidneys, their appearance in the urine cannot be accepted as a basis for operation.

While the phloridzin test seems fairly reliable when positive—*i. e.*, the author has never seen the sugar excretion by an extensively diseased kidney, yet it is entirely unreliable when negative, since the healthy kidney sometimes fails to excrete sugar after phloridzin ingestion. Thus, Rovsing has made nine nephrectomies, including five for tuberculosis, when the phloridzin test was negative, indicating that the opposite kidney was diseased; yet in 8 of these cases complete and immediate recovery followed.

VALUE OF UREA EXCRETION. The normal urea output shows a reliable kidney; yet the converse is not true, since in 31 of his 112 cases the urea excretion from the opposite kidney was distinctly below normal, yet the kidney excreted normally after the removal of its fellow.

Among 112 nephrectomies there were 9 deaths, or 8 per cent. Prior to 1901 the ureter catheter was not much used; during this period Rovsing made 52 nephrectomies with 7 deaths, or 13.2 per cent.; since 1901, with constant use of the ureter catheter, he has performed 60 nephrectomies with 2 deaths—that is, 3.3 per cent. Kümmell, using the phloridzin and cryoscopy tests, reduced his mortality from 33 to 6.4 per cent., and ascribes the improvement chiefly to these tests; Rovsing has achieved 3.3 per cent. mortality, though disregarding these tests; and these two deaths were in nowise the result of insufficient function of the remaining kidney.

Rovsing's conclusions are:

1. Death from insufficiency of the opposite kidney need not be feared when the ureter catheter is intelligently used.

2. Functional integrity of the kidney cannot be determined by any of the so-called functional tests, for the temporary function is no measure of the functional ability of the normal kidney. This organ's activity may be temporarily reduced, especially by disease of the sister kidney.

3. The improvement in results is to be ascribed neither to cryoscopy nor to the phloridzin test.

4. Blood cryoscopy is absolutely worthless and misleading both ways.

5. The phloridzin and urea excretion tests seem to be reliable when positive, but unreliable when negative; the urea test is much the less deceptive of the two.

6. Improvement in results is due to the routine use of the ureter catheter and the examination of the separate urines.

When the urine from the sister kidney is free from albumin, blood, and microbes that kidney may, as a rule, be relied upon to perform the full renal function after the removal of its fellow; while pus and microbes in the urine of the second kidney usually prohibit nephrectomy upon the first. Albumin in the urine of the second kidney without pus and microbes means simply blood intoxication from the diseased organ and is a strong indication for the prompt removal of the latter.

This interpretation of the findings from the second kidney is well illustrated in 8 of the author's nephrectomies for tuberculosis, in each of which the urine from the second kidney contained albumin. In 3 of these the functional tests indicated integrity of this kidney, and although the urine of each contained tubercle bacilli, nephrectomy was performed; all three patients died within three weeks. In the remaining 5 cases the second kidney furnished urine containing albumin but no bacteria nor pus; and although cryoscopy and the phloridzin tests indicated impairment of function the opposite kidney was removed and all five patients recovered.

In the few cases where the ureter catheter cannot be introduced Rovsing explores each kidney through a lumbar incision prior to nephrectomy; and while admitting the inaccuracies incidental to such exploration, he relates an instance in which its possible value was demonstrated.

Israel's[1] great experience leads him also to place little reliance on the so-called functional tests. Among other objections he cites one which applies also to the ureter catheter as generally used—namely, that the time during which the renal function is under examination is too brief to warrant the acceptance of the result as an index to the functional status of the organ. However, the ureter catheter does at least prove the existence of the second kidney—and this is more than can be affirmed of the various urine segregators, which he unqualifiedly condemns. He thinks that in some cases the exposure of the opposite kidney is justified for the determination of its integrity.

Casper[2] naturally expressed complete reliance on the ureter catheter as a means for securing positive information; and was inclined to consider cryoscopy as a valuable addition to our sources of information. As evidence to this effect he stated that since the general introduction of the functional tests the statistics of five different surgeons show a mortality of 10 per cent. of 130 cases of nephrectomy for renal tuberculosis; while prior to that time the same surgeons lost 21.7 per cent. of 139 cases of the same operation for the same cause.

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[1] Archiv f. klin. Chirurgie, Bd. lxxvii., Heft 1.

[2] Ibid.

Moreover, in the earlier period 22.7 per cent. of the mortality was ascribed to insufficient functional activity of the remaining kidney; while since the introduction of these tests only 7.7 per cent. of the mortality was due to this cause. The improvement in results was, however, to be credited to the ureter catheter rather than to cryoscopy.

Kümmell, Kapsammer and others urged the value of cryoscopy; while Cohn (physiologist) explained that cryoscopy of the blood could not determine the functional activity of the kidneys, since the blood concentration is the resultant of many contributing factors, of which the renal activity is but one.

The urine separator of Luys was commended by Frank; Kocher also regarded it as valuable when its results were positive.

In the discussion by the French Urological Association, Rafin stated that he had lost 3 out of 20 nephrectomies for tuberculosis; in 2 of these the results of catheterism of the ureters had been a warning against operation; in the third, separation of the urines by either catheter or divisor had been impossible because of the limited vesical capacity. In all 3 death resulted from functional incapacity of the remaining kidney.

In the remaining 17 cases the ureter catheter had given information which warranted the belief in the capacity of the opposite kidney; and this belief had in every case been justified by the recovery of the patient.

Legueu had used the ureter catheter as a preliminary diagnostic measure in over 20 cases of nephrectomy, and had lost only 1 of them.

Albarran said he had done 57 nephrectomies for renal tuberculosis, of which only 2 had died. In these 2 cases he had had no opportunity to study the separate urines from the respective kidneys obtained by the ureter catheter. He had lost no case in which such study had been made; he regards this measure as an essential preliminary to operations involving the renal integrity, and believes that this is now a generally accepted tenet.

As to the so-called functional tests, he has tried on each of 20 patients, suffering from various surgical diseases of the kidney, two or more tests, including the elimination of colored substances, of phloridzin, cryoscopy of the blood, and the usual analysis. In 10 of these cases there was essential accord between these tests and the state of the kidney; in the remainder serious discrepancies between the tests and the facts were observed. He also found that the tests indicated great variations of the renal activity of the same patients on different days—variations which found no corroboration by the usual methods of examination.

He has concluded that *but little reliance should be accorded any cryoscopic formula;* and he does not know any one reliable method for determining the renal integrity; yet he is inclined to attach importance to a concordance of results by several methods.

Berg stated that to avoid the use of the ureter catheter he has used the *indigo-carmine test* of the elimination by the respective kidneys—observing the appearance of the color at the ureteral orifice through the cystoscope with eminent satisfaction.

Czerny, speaking by invitation, stated that he placed much reliance on this test; he injects $\frac{1}{4}$ c.c. of a 4 per cent. solution of indigo-carmine into the muscles; in ten minutes the blue urine can be observed by the cystoscope to issue from the ureteral orifice when the kidney is functionating properly, the excretion ceasing in about two hours. It has the advantage over methylene blue that no chromogenic substances are produced.

Albarran and Casper expressed the opinion that this method should be limited to those occasional cases in which the ureter orifices cannot be recognized.

Albarran's *opinion of the divisors* is indicated by his mention of a case in which he had used the Luys instrument, which furnished normal urine from the right kidney, none from the left; on the following day Cathelin used his own device, with an identical result. Albarran then catheterized the left ureter, giving vent to a large amount of purulent urine. Cathelin's assertion, based on the results furnished by his own instrument, that the normal kidney may for hours fail to secrete, does not find credence with Albarran.

ON THE DETECTION OF NEPHRITIS. Cabot[1] furnishes a comparison of the postmortem findings with the antemortem diagnosis of kidney conditions in all cases of acute and chronic nephritis autopsied at the Massachusetts General Hospital since 1893. His summary of these observations is noteworthy, especially because of his known experience in the refinements of microscopic diagnosis. He concludes:

1. Many cases of acute glomerular nephritis cannot be recognized by any clinical methods now practised.

2. In some cases of subacute and chronic glomerular nephritis diagnostic means are also defective; but in the great majority the postmortem findings were anticipated by the clinical. "Our success in the diagnosis of chronic glomerular nephritis is almost as constant as is our failure in the acute cases."

3. In chronic interstitial nephritis our diagnostic ability stands between

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[1] Journal of the American Medical Association, 1905, Nos. 11 and 12.

that in acute and that in chronic glomerular nephritis. Correct diagnosis was made in about one-third of the cases.

4. Implicit reliance upon urinary findings leads to mistaking for nephritis the senile and arteriosclerotic changes, as well as to mistaking passive congestion and acute degeneration for acute nephritis. "Even in cases where no lesions are to be found at autopsy the urine is occasionally highly albuminous and full of casts."

5. In an ordinary urinary examination common errors are: (*a*) an attempt to estimate urea without an accurate knowledge of the patient's metabolism; (*b*) the assertion that small mononuclear cells are necessarily derived from the tubules.

6. Cryoscopy and other attempts to test renal permeability are as yet incapable of supplementing the older methods.

"The vast majority of estimations of urinary solids, including urea, are, in my opinion, a waste of time." "The attempt to estimate the anatomical condition of the kidney by the measurement of albumin and the search for casts is fallacious in the extreme."

The most reliable data about the urine are those most simply and quickly obtained—the twenty-four-hour quantity, specific gravity, and color.

Summary of Opinions. The overwhelming weight of opinion is then that the modern so-called functional tests, including cryoscopy, phloridzin, and pigment excretion, cannot in their present stage of evolution be relied upon to indicate the functional capacity of the kidneys; that they must be regarded at best as but supplementary to the standard analyses with test-tube and microscope, and in no sense worthy of consideration when opposed to these latter.

For the surgeon who contemplates operation on a kidney it is essential that the urine be procured from each kidney through the ureter catheter for differentiation and for information as to the functional capacity of the opposite organ. In these cases in which ureter catheterism is impossible the inspection of the ureter orifices through the cystoscope during the elimination of indigo-carmine or other pigment seems to be regarded as the best substitute.

The various bladder divisors or urinary segregators have become so notoriously unreliable that they are generally regarded as worse than useless. At best they may be considered, when controlled by the cystoscope, as a poor substitute for the ureter catheter when for any reason the latter cannot be introduced.

Nephrectomy for Tuberculosis. The propriety of nephrectomy for tuberculosis of the kidney was also discussed by both the German surgical and the French urological associations.

There was practical unanimity of opinion and practice; it was agreed that renal tuberculosis when not operated on was usually fatal, and that the removal of the diseased kidney was the only operation worthy of consideration—nephrotomy and resection of the kidney having been definitely abandoned.

Thanks to the accuracy with which the functional condition of the opposite kidney can be determined by means of the ureter catheter, the immediate results of nephrectomy for renal tuberculosis have become surprisingly good; the operative mortality, which eight or ten years ago was from 20 to 25 per cent., now ranges from 3 to 10 per cent. Casper's figures show a reduction from 22 to 10 per cent. by the same five surgeons since the general use of the ureter catheter, this mortality including all cases dying within six months of operation from any cause.

The treatment generally adopted for renal tuberculosis is, then, the removal of the diseased kidney, after preliminary determination of the functional integrity of the opposite kidney through the examination of urine obtained by means of the ureter catheter.

Surgical Treatment of Nephritis. The treatment of various kidney lesions loosely designated "nephritis" by incision of or separation of the renal capsule, is still the subject of investigation. It now seems evident that the anatomical changes commonly understood by the term chronic nephritis—those changes caused by toxins circulating in the blood and derived from the tissues—are not susceptible to improvement by nephrotomy or decapsulation. The hypothesis that the latter operation would be beneficial by providing a new and curative circulation through new anastomoses, irrational in theory, has been definitely dispelled in practice and in the laboratory. Among the later proofs furnished is the work of Thorndike;[1] he found that decapsulation of the kidneys in animals was followed by the formation of a new and firm capsule of cicatricial tissue, and that the collateral circulation was not appreciable.

The renal lesions that have been frequently benefited by these operations are (1) those due to malposition of the kidney, with consequent disturbance of circulation and nutrition, and often with secondary infection; Edebohls' long list of successful cases is composed largely of these. In such cases the cure seems due not to relief of tension nor collateral circulation, but to the restoration of normal circulation and nutrition following the institution of the normal anatomical relations. (2) The condition commonly termed "hemorrhagic nephritis"—etiology more or less speculative—has frequently been symptomatically cured by either nephrotomy, splitting of the capsule, or decapsulation. The curability of these cases, formerly known as "essential renal hæmaturia," by an exploratory nephrotomy, was well recognized long before Harrison and

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[1] Boston Medical and Surgical Journal, April 6, 1905.

Edebohls proposed the rather theatrical term "surgical treatment of nephritis." In these latter days cases of this sort cured by decapsulation are reported in such manner as to give the impression that decapsulation is a distinct therapeutic advance. Thus Nicholich reported to the French Urological Association[1] the case of a man, aged thirty-six years, who had suffered from nephralgia and hæmaturia for a month, and had developed general œdema; the ureter catheter showed the hemorrhage to be bilateral. After medicines and diet had failed to furnish relief, decapsulation and nephropexy of the right kidney was performed; two days later the urine was free from blood, and a month afterward the patient left the hospital cured.

Legueu reported the surgical treatment of 3 cases of hemorrhagic nephritis of which hæmaturia was the sole symptom ("*essential renal hæmaturia*"). One case is noteworthy as presenting a sharp contrast with that of Nicholich above noted.

Legueu's patient was a woman, aged twenty-five years, who had had hæmaturia continuously for four years, without other symptoms. The ureter catheter repeatedly showed the hemorrhage to be bilateral. The left kidney became painful and was decapsulated. A year later the urine still contained blood, which, however, issued from the right kidney only—indicating, the reporter adds, the benefit of the operation.

It would seem that, with our present information, decapsulation and "the surgical treatment of nephritis" accomplish nothing more than nephrotomy for essential renal hæmaturia and pyelitis.

Treatment of Chronic Nephritis by Lavage of the Renal Pelvis. Irrigation and drainage of the renal pelvis through the ureter catheter in cases of pus infection of this surface (pyelitis) have been extensively employed since the pioneer work of Casper, Albarran and others. Ayres[2] thinks the method capable of great benefit in cases of chronic nephritis, especially the parenchymatous form. He reports the treatment of 46 such cases in this way; in all but 8 (six or which were still under treatment) tube casts and albumin had disappeared from the urine. Of the 38 cases all showed tubular epithelium and 22 showed more than a trace of albumin. Of 12 cases of advanced nephritis, 3 (of the parenchymatous form) were markedly improved; 3 cases of interstitial nephritis were less favorably influenced, and 2 cases that had been decapsulated without benefit were not at all benefited.

He uses silver nitrate in boric acid solution—1:8000 gradually increased to 1:2000—injecting but small quantities (1 drachm, for example) at a time.

The prevalent conception of chronic parenchymatous nephritis—that it is due to blood intoxication—is difficult to reconcile with a conception of cure by lavage of the renal pelvis.

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[1] Proceedings, p. 667

[2] Medical News, July 1, 1905.

Movable Kidney. The reaction against promiscuous operation for the relief of movable kidney and the limitation of this operation to suitable cases has become notable. Treves[1] reports that he has treated 300 cases of movable kidney by mechanical support and without operative measures, and expresses the opinion that suturing the kidney should be a rare operation. Israel took essentially the same position four years ago. McWilliams[2] reviews 61 cases treated surgically in a New York hospital, and concludes that most of them were not benefited by operation. Balch and Torbert[3] review the cases operated at the Massachusetts General Hospital from 1890 to 1904, and considers that 28 of the 86 cases were relieved.

Aaron,[4] who two years ago reviewed 442 cases of movable kidney, treated without surgical intervention, shows that the surgical fixation of a movable kidney fails to relieve the dyspeptic and nervous symptoms incidental thereto, because the latter are due not to abnormal mobility of the kidney but to the prolapse of other viscera, notably the stomach. The kidney is normally movable and abnormal only when palpable; to fix it is to induce an abnormal condition.

The important clinical item is to determine whether the symptoms can be relieved by mechanical support; this information is elicited by firm pressure of the physician's hands above the symphysis, the doctor standing behind the patient. When such pressure secures relief of symptoms, a truss or band should be applied to this suprapubic region.

Renal Retention with Anuria. Watson[5] analyzes 200 cases from the literature with his personal additions. His conclusion is that while medical treatment, including the subcutaneous injection of saline solutions, seem to have some value, the best treatment is a prompt and rapidly performed lumbar nephrotomy.

Gonococcus Infection of the Kidney. Le Fur[6] removed a kidney containing about a litre of pus and many gonococci, the infection having apparently reached the kidney not by ascent from the urethra but by way of the blood.

Lumbar Abscess Opening into the Bladder. Cathelin[7] reported a case in which a tumor in the lumbar region was associated with purulent urine; a diagnosis of pyonephrosis was made and operation performed. The tumor was discovered to be a lumbar abscess proceeding from Pott's disease of the spine, which had opened into the bladder. The issue was fatal.

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[1] Canadian Practitioner and Review, January, 1905.

[2] American Medicine, October 20, 1904.

[3] Boston Medical and Surgical Journal, March 2, 1905.

[4] American Medicine, August 5, 1905.

[5] Boston Medical and Surgical Journal, September 15, 1904.

[6] Proceedings of the French Urological Association, 1904, p. 753.

[7] Ibid., p. 613.

Sloughing of the Kidney. Desnos[1] made a nephrolithotomy without untoward event; in the course of the following fifteen days necrosis and spontaneous sloughing of the kidney occurred without infection—presumably from thrombosis of unknown origin. He considers the case unique.

THE URETER.

Cystoscopy of the Ureter Orifice. The cystoscope has revealed the importance attaching to the ureter orifice as an index to morbid conditions of the ureter and renal pelvis. An excellent *résumé* of present knowledge on this subject is furnished by Tilden Brown.[2] The normal orifice is sometimes a pinkish slit in a low papilla of yellowish-white mucosa; sometimes a conical dimple at the apex of a more pronounced papilla; or a prominent lip at whose anterior base lies a nearly concealed but normal ureter mouth. Such openings are normal, yet they do not preclude the possibility of disease of the kidneys associated with them.

An abnormal ureter mouth may be a conspicuously gaping one, or it may be invisible. The papilla may be a distinct tumor, the color varying from a reddish opacity to a glistening white; the latter appearance results from œdema of the mucous membrane, the electric transillumination of which produces the phenomenon mentioned. While this œdema may be produced by various other causes, it is a regular result of the presence of a calculus in the lower end of the ureter. In minor degree it accompanies infections of the renal pelvis and ureter.

An irregular ulcer adjoining the ureter mouth or even usurping this area, with a surrounding hyperæmic zone and uneven base, is characteristic of the tuberculous infection which has descended from the corresponding kidney.

The discharge of pus or blood or both from either ureter is easily identified by the cystoscope; and in many cases no further information need be elicited. Many times, however, a microscopic examination of the ureter output is desirable; and this can usually be secured by introducing the short ureter catheter two inches into this duct. The long catheter, passed into the renal pelvis, determines anatomical abnormality, such as a stricture.

Among the cases of ureter catheterism examined were three of renal tuberculosis without noticeable abnormality of the ureter mouth of the diseased side; yet the ureter catheter secured in each case urine containing tubercle bacilli, and the excised kidneys showed the lesions of tuberculosis. In two male patients with symptomless but decided unilateral hæmaturia of moderate duration with sterile urine, the bleeding ceased after catheterization; while this may have been a coincidence, yet it suggests the desirability of repetition in other cases of so-called essential renal hæmaturia. In another case a male, aged sixty-seven years, a persistent hæmaturia of long duration was not appreciably influenced by ureter catheterism and lavages of the renal pelvis with adrenalin solution. The postmortem section, fourteen months after the beginning of the hæmaturia, showed a hypernephroma of the bleeding kidney.

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[1] Proceedings of the French Urological Association, 1904, p. 752.

[2] Medical News, March 11, 1905.

The diagnostic value of the cystoscope and ureter catheter was indicated also in a male patient aged forty years, who had excessive and continuous hæmaturia and a large tumor in the left side of the abdomen, which was considered the spleen, left kidney, or retroperitoneal tumor by different observers. The ureter catheter showed that the left urine was normal, the right very bloody. The case was one of neoplasm of the right kidney and enlargement of the spleen.

Occlusive Ureter Catheter. Nitze[1] uses and recommends an occlusive catheter for the ureter. The distal segment of a specially constructed catheter contains a small rubber balloon, which, after the catheter has been introduced into the ureter, is filled with water.

Assurance that the balloon completely occludes the ureter is secured by injecting a solution of methylene blue through the catheter into the ureter above the balloon. An ordinary catheter is then introduced into the bladder; if the urine escaping through this remains free from the blue color occlusion of the ureter is complete.

The object of this rather elaborate apparatus is to secure complete and absolute exclusion of the secretion from one kidney—the ordinary ureteral catheter offering the theoretical possibility that it may permit the escape of some urine around it into the bladder.

Periureteral Abscess. Neumann[2] relates a case of abscess formation around the vesical end of the ureter, which he evacuated and drained by an incision from the perineum.

Prolapse of the Ureter. The cases commonly so designated really consist of a dilatation of the vesical end of the ureter (sometimes by a calculus) and infiltration of the surrounding mucous membrane, the whole constituting a conical protrusion into the vesical cavity, capped by a crater-like orifice. Pasteau[3] mentioned six such cases that had come under his observation, from two of which he had removed a ureteral calculus.

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[1] Centralblatt f. Krankheiten d. Harn. u. Sexual Organe, 1905, p. 113.

[2] Deutsche Zeitschrift f. Chirurgie, 1905, Nos. 3 and 4.

[3] Proceedings of the French Urological Association, 1904.

Casper had seen two such and showed a photograph of one, of pyramidal shape; he thinks them congenital and requiring no interference, the presence of the stone being incidental.

Albarran[1] observed true prolapse of the ureter with consequent hydronephrosis in a man aged thirty years. He made a suprapubic cystotomy, returned the prolapsed portion of the ureter, and stitched the bladder wall around the ureteral orifice so as to prevent recurrence of the prolapse.

THE BLADDER.

Vesical Tumors. The German Surgical Society at its meeting in 1903 appointed a committee to institute a collective investigation as to the growth of tumors in the bladders of workers in aniline dyes. At the 1904 meeting Rehm announced for this committee that the report was not yet completed. The question propounded by Küster, whether these tumors were found in parts of the urinary channel other than the bladder, could, however, be answered in the affirmative. Rehm had operated on an aniline worker for vesical carcinoma; at the autopsy carcinoma of the right kidney and ureter was found, and extensive metastases in the lymph glands of the abdominal cavity. Rehm considered the kidney carcinoma the primary growth.

Strauss and Schwerin reported cases of *carcinoma of the urinary tract in aniline workers;* in one case the kidney was involved.

Lempe demonstrated a bladder cancer removed from an ectopic bladder.

THE INTRAVESICAL REMOVAL OF BLADDER TUMORS through the cystoscope by Nitze's method was discussed by Weinrich. Of 271 benignant tumors 151 were operated on through the cystoscope, with 1 death. Some of these tumors were as large as small oranges and some required twenty sittings for their removal by galvanocautery. These sittings can be given in the office without interference with business; and it is claimed —though without satisfactory warrant—that this cautery removal gives greater security from recurrence. But the broad-based malignant tumors should not be treated in this way.

Kapsammer limits this method to small tumors that can be removed at one sitting and for cauterizing ulcers; larger tumors should be removed by suprapubic cystotomy.

Treatment of Vesical Growths by Resorcin. Janet[2] reports a case of intravesical tumor, apparently an epitheliomatous degeneration of a papilloma, in a man aged seventy-six years; because of the malignant features

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[1] Proceedings of the French Urological Association, 1904.

[2] Ibid., p. 535.

Guyon had advised against extirpation. Janet injected into the bladder watery solutions of resorcin, increasing in strength from 10 to 50 per cent., making five instillations of 5 c.c. each. Arrest of hemorrhage and improvement of the vesical symptoms were prompt and the result permanent.

Forgue said he had seen similar results with marked decrease in the size of vesical growths follow the injection of small quantities of Peru balsam into the bladder.

Desnos recalled his publication, several years earlier, of equally good results, including the disappearance of intravesical tumors from the intravesical instillation of methylene blue.

Congenital Diverticula of the Bladder. Two comprehensive articles on this subject have been furnished, one by Meyer[1] the other by Pagenstecher.[2] Each reports a personal observation and reviews the literature. About fifty such cases have been recorded; in many of them the vesical anomaly was found to be associated with malformation of the pelvic organs, and in newborn infants. Pagenstecher's patient was a man aged thirty-three years, whose symptoms had appeared about a year earlier, as frequent vesical and rectal tenesmus and vesical infection. After attempts at cystoscopy had failed, a suprapubic exploratory incision was made; a diverticulum almost as large as the bladder was found, into which the left ureter opened. Suture of the bladder wall with irrigations proving useless, the diverticulum was removed after resection of the sacrum; the left ureter was resected and implanted into the bladder. After a tedious urinary fistula finally closed ultimate recovery ensued.

Cystitis. Hofmann[3] collects and attempts to analyze 147 articles on cystitis; many of them are useless because the authors failed to recognize cystitis as an infection secondary to a prior lesion; they therefore persist in treating the cystitis rather than seeking the cause thereof. Many agents are recommended for both internal and local use; only one important item is emphasized, namely, the value of the retained catheter for resting and draining the bladder.

Tuberculosis of the Bladder. Minet[4] advises the local use of *pyrogallic acid* solution in the treatment of vesical tuberculosis; he injects 5 c.c. of an aqueous solution, from 2 to 5 per cent., daily. He has seen no cures, but regularly observed marked diminution in the pain and frequence of urination and arrest of secondary infections. (Compare Rovsing's results from injection of carbolic acid solution.)

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[1] Centralblatt f. Krankheiten d. Harn. u. Sexual Organe, 1905, p. 289.

[2] Archiv f. klin. Chirurgie, Bd. lxxiv., No. 1.

[3] Centralblatt f. die Grenzgeb. d. Med. u. Chirurgie, 1904, No. 23.

[4] Proceedings of the French Urological Association, 1904.

Foreign Bodies in the Bladder. Durrieux[1] observed a case in which a vesical calculus weighing 185 gm. (nearly 6 ounces) induced no subjective symptoms and was discovered accidentally; he states that three similar cases have been recorded.

Trouvé[2] reports a case in Guyon's clinic in which a celluloid pin was removed from a woman's bladder through a vesicovagnail incision, with immediate closure of the wound, catgut being used to unite the edges of the vesical mucosa and silver wire for the vaginal wall. Guyon has long used this incision and strongly advises it in preference to the suprapubic or ·symphyseal (subpubic) avenue of approach, because it is free from danger of infection and inflicts no permanent damage.

Englisch[3] discusses the various methods attempted for *dissolving calculi in the bladder,* and furnishes a very interesting chapter on the spontaneous disintegration of bladder stones. He gives brief histories of 102 authentic instances of such disintegration collected from the literature, and adds four from his personal observation. He concludes that this occurs chiefly to calculi composed largely of urates.

I have personally observed a case in which a vesical calculus seen by the cystoscope to be about as large as a walnut was found six weeks later to have separated into three pieces. Six months afterward several small fragments having meanwhile been voided with the urine, the bladder and urine were normal.

Hernia of the Bladder. Plummer,[4] operating for inguinal hernia, discovered a second sac intimately adherent to the intestinal sac; as the testicle of the opposite side was not in the scrotum, the second sac was opened, and then recognized as the bladder. The wound in this viscus was sutured, primary union resulting.

The author, discussing the general topic of hernia of the bladder complicating that of the intestine, remarks that this complication is not a rare curiosity but a frequent occurrence. That this combination so often results in a wound of the bladder is due partly to the unwariness of the surgeon and partly to the difficulty often experienced in identifying the bladder. Two features are characteristic of the complicating bladder hernia; the presence of a sac to the inner (median) side of the intestinal sac and the abundance of fat. If the surgeon were constantly mindful of the possibility fewer mistakes would be made.

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[1] Centralblatt f. Krankheiten d. Harn. u. Sexual Organe, 1905, p. 109.

[2] Annales des maladies des organes genitourinaries, 1905, p. 1013.

[3] Archiv f. klin. Chirurgie, Bd. lxxvi., No. 4.

[4] Journal of the American Medical Association, July 22, 1905.

THE PROSTATE.

Reaction of Prostatic Secretion. Schulz[1] found the prostatic secretion in fifteen normal subjects always alkaline or amphoteric, never acid.

Echinococcus Cyst of the Prostate. Kaveczky[2] reports the case of a man, aged forty-six years, who repeatedly experienced retention of urine. A fluctuating tumor as large as a child's head was found between the rectum and the prostate; by puncture there escaped a clear fluid containing no albumin but many echinococcus hooklets. Through a perineal incision the sac, apparently originating in the prostate, was removed. The author states that this is the first proven case of echinococcus cyst in this locality, though Jocin collected five cases probably of this nature.

Therapy of Chronic Prostatitis. Posner,[3] in discussing the therapy of the conditions clinically classed as chronic prostatitis, endeavors to extend the analogy instituted by Toldt, Robin, and Fürbringer between the prostate and the mammary glands of the female, founded upon anatomical structure (acinose glands) and chemical products (lecithin corpuscles). Bab, in Leyden's laboratory, showed that every obstruction of the mammary secretion in the ducts causes a local leukocytosis, the leukocytes absorbing the lecithin granules; the secretion is positively chemotactic to leukocytes. At the beginning of lactation after the termination of pregnancy such chemotaxis is pronounced; leukocytes loaded with fat are "colostrum corpuscles," really an inflammation (?).

Posner transfers this description to the prostate, and speculates that a "chronic prostatitis" may be quite analogous to the secretion of milk in the mammæ with obstruction in the ducts. In support of this analogy he states that leukocytes in chronic prostatitis are loaded with fat, sometimes so overloaded as to make the prostatic origin of the leukocyte apparent, since no other leukocytes contain so many fat granules (unless fat has been introduced into the urethra as a lubricant for bougie or catheter shortly before). Stained sections of the prostate show numerous lecithin granules in the entire tubular epithelium (the source of the fatty secretion); also free lecithin granules in the lumen of the glands.

The author infers that in the prostate, as well as in the mamma, fat that is lecithin exerts a chemotactic influence upon the white blood corpuscles; in other words, that every interference with secretion suffices to call forth inflammatory processes. Hence chronic prostatitis may exist without infection; moreover, the evidences of inflammation in many hypertrophied prostates do not prove that the inflammation caused the hypertrophy, as Ciechanowsky and others maintain; they suggest rather that the hypertrophy may be the primary, the inflammation the resultant lesion, even where no infection has occurred.

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[1] Wiener klin. Wochenschrift, 1904, No. 43.

[2] Annales des maladies des organes genitourinaries, 1905, p. 675.

[3] American Journal of Urology, March, 1905.

The author's ingenious speculations are vitiated by his failure to distinguish between "inflammation" and leukocytosis; yet because of the application of the analogy between prostate and mamma they are reproduced here.

Prostatectomy. This subject was discussed by the French Urological Association.[1] Escat presented the results of 410 cases of perineal prostatectomy; death followed in 47 cases, 11.3 per cent.; a urethroperineal or rectal fistula in 8 per cent., and permanent incontinence of urine in 3 per cent. The partial removal is more dangerous than the total prostatectomy; and the attack of the prostate from the rear surface through a curvilinear or V-shaped incision is the only method of approach meeting the author's approval or that of other French surgeons.

Escat favors perineal rather than suprapubic prostatectomy because the mortality of the latter is somewhat greater (10 to 15 per cent.).

Proust collected 813 cases of perineal prostatectomy with a mortality of 7.13 per cent. He, too, considers the partial more dangerous than the complete prostatectomy, and frankly admits that the suprapubic gives better results than the perineal operation, though at a somewhat greater risk. While neither is suitable for all cases, yet the Freyer operation without the removal of the prostatic urethra is, from the surgical standpoint, the best for general use.

Hamonic has abandoned morcellement, removing the lobes *en bloc* so far as possible. Among the remote evil results to be considered from the perineal operation are cicatricial strictures of the prostatic urethra. He avoids operation when the prostate is small and hard.

Albarran found in 39 perineal operations that the removal of the prostate was easy in 29, difficult in 7, and impossible in 3. In difficult cases there is danger of tearing through the capsule and opening the periprostatic veins; this is apt to be followed by severe hemorrhage and general septic infection. The capsule increases the difficulty of the operation, but is a guarantee of security. He has lost 2 cases out of 66 perineal prostatectomies (3 per cent.). Of 34 cases of chronic complete retention before operation followed for a year thereafter, 32 were completely successful; in 2 cases there was residual urine, amounting to a few ounces. He thinks that the failure to evacuate the bladder completely in these 2 cases was due not to the persistence of any obstruction but to the existence of a sclerosis of the vesical walls consecutive to chronic cystitis. He advises operation in all cases of chronic complete retention, unless there be special objections in individual cases.

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[1] Annales des maladies des organes genito-urinaries, 1905, p. 1634.

Of 23 operations for chronic incomplete retention there were 12 complete successes and 3 failures. These latter were cases of chronic hypertrophic prostatitis which are often confounded with hypertrophy. In younger men this is cured by massage; in the old it may remain unimproved by perineal prostatectomy—in fact, the retention may be aggravated.

Albarran[1] thinks the advantage of the perineal over the suprapubic prostatectomy is the lower mortality. He is inclined to believe, however, that improvements in the technique of the transvesical operation will reduce the mortality, whereupon this will become the operation of choice, superseding the perineal as the standard operation; for, as he says, "the therapeutic results of complete transvesical prostatectomy are remarkable; in almost all the published cases one notes that the patients urinate easily and completely, being able to empty the bladder spontaneously." Furthermore, there are no permanent fistulæ, no cicatricial contractions of the vesical neck, no injuries to the rectum, no loss of sexual power following in the train of the operation. Still, the greater mortality at present constitutes a barrier that must be considered.

The improvements in operative technique which Albarran thinks possible have been supplied—though like most surgeons, he has as yet neglected them. They are chiefly (1) making the operation in two stages, and (2) anæsthesia by nitrous oxide. The two-stage operation virtually eliminates the dangers of septic infection of the suprapubic tissues, which has been the chief cause of the mortality; and nitrous oxide anæsthesia, which amply suffices for this operation, but is, as ordinarily practised, too brief for perineal prostatectomy, avoids the dangers to kidneys, heart, and lungs associated with chloroform and ether. Moreover, nitrous oxide may be safely used for several hours' continuous anæsthesia, as B. Van Hoosen has shown.

In 12 consecutive cases of suprapubic cystotomy for various purposes in men over sixty years of age, in which these improvements have been adapted, I have had no mortality.

Discussing the indications for perineal prostatectomy, Albarran ascribes his better record (3 per cent. mortality, while that of 530 cases collected by Watson was 6 per cent., Proust's 7, and Escat's 11 per cent.) to his great care in determining the contraindications to operation. Among these he enumerates (1) certain conditions of the bladder, including primary vesical atony, sclerosis of the vesical walls secondary to cystitis, and febrile infection proceeding from the bladder. The last is especially important, since he thinks that much of the operative mortality results from infections of the operative field, which are acute and active at the time of operation. He advises that these infections be reduced by urotropin internally and vesical lavage with the retained catheter when needed, before operation be undertaken. He especially warns against performing prostatectomy in cases of chronic distention of the bladder, advising that such bladders shall be gradually emptied by the careful and aseptic use of the catheter before operation is performed.

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[1] Annales des maladies des organes genitourinaries, p. 352.

2. The functional activity of the kidneys should be determined by the various methods now in vogue—excretion of methylene blue, cryoscopy, and the phloridzin test—to a concordance of whose results Albarran ascribes much value, though admitting that any one may mislead.

3. The general condition of the patient is of course a vital matter; yet the cachexia resulting from infections of the urinary tract is an indication for rather than against prostatectomy, provided the renal activity be maintained.

The results of his perineal prostatectomies are observed in 44 cases operated on more than a year before, and 15 cases operated on three to four and a half years earlier. Of these he considers 55 complete successes, in that they empty the bladder completely and have no occasion to use a catheter; 4 partial successes, who have less residual urine than before operation, but still require the catheter; and 3 complete failures, whose residual urine has not been decreased by operation.

He considers it noteworthy that of the 7 partial or complete failures, 5 patients had small prostates and incomplete retention. He also states that the total number of small prostates operated on was 11; of these 5 presented a median lobe, the removal of which was followed by complete success. The remaining 6 had no median enlargement, and in only 1 was complete success attained.

The author calls especial attention to this condition—which he designates "hypertrophying prostatitis," because prostatectomy fails to relieve it, as was illustrated in the five failures just mentioned. The salient features are a small or moderate prostate without tendency to deformity of the vesical neck and without median lobe; consistence rather soft, no sphenoidal bodies (adenomata); the structure is that of chronic prostatitis. The symptoms are those of partial and moderate retention, finally, after a long course, terminating sometimes in complete retention.

These are instances of chronic prostatitis; the visible obstacle to urination is absent or minimal, the retention being due to imperfect opening of the urethrovesical orifice. They are distinct from cases of true prostatic (fibroadenomatous) hypertrophy, the common form, in several clinical respects, among which is the important feature, already mentioned, that they are not cured nor even notably relieved by perineal prostatectomy.

Nicholich performed 12 perineal prostatectomies with 2 deaths, 12 Freyer's operations with 1 death; he thinks the latter is the operation of the future because more rapid, easy, and less dangerous.

In the German Surgical Society, Czerny opened the discussion on prostatectomy. He is inclined to include among the indications for operation not merely difficult catheterism, but also, perhaps, the early stage of prostatic hypertrophy. He considers the perineal and the suprapubic operation satisfactory; he uses for the former Zuckerkandl's incision, but thinks it capable of improvement.

Kümmell stated that he had used various methods in 114 cases; he secured many good results from castration but none from vasectomy; Bottini's operation was very unsatisfactory. His experience with both perineal and suprapubic operations has been distinctly favorable; the unsatisfactory results have been due largely to weakness of the detrusor muscle, which is irremediable. The chief contraindication is not age, but disease of the kidney.

He has found enucleation of the prostate easy. In perineal operations the urethra should always be opened and complete removal performed; partial extirpation is poor policy.

Israel makes the suprapubic operation with perineal drainage. Nicholich and Frank also regard this as the best of the various excisions, and consider it the operation of the future.

Partial perineal removal of the prostate without injury to the urethra was advocated by Küster and Riedel.

The Bottini operation found no advocate of importance, and may be regarded as completely reinterred. May its second resurrection be long deferred.

Young,[1] formerly an ardent advocate of the Bottini operation, after an experience of 50 cases of perineal prostatectomy, now considers this the best method for relieving prostatic obstruction.

In England the perineal operation is held in far less esteem than is the suprapubic or "transvesical" enucleation. This attitude of British surgeons is in large measure due to the precept and example of Freyer, who adapted and practised Fuller's total enucleation. Our English cousins, by the way, call this procedure "Freyer's operation," though it was performed, recorded, and advocated by Fuller a year earlier; similarly they still call the original suprapubic prostatectomy "McGill's operation," though it was thrice performed, recorded, and advocated by myself before McGill made his first operation, as McGill himself frankly admitted.

At the meeting of the Medical Society of London May 8, 1905, Freyer[2] discussed his experience with 195 cases of suprapubic prostatectomy. His 110 published cases gave an operative mortality of 10 per cent.; but in the later 85 cases the mortality was reduced to 5.8 per cent. He was especially gratified to report that among these operated patients 9 were over eighty years old and 1 aged seventy-nine, all of whom recovered; 9 were still alive, with good urinary control; the tenth—carcinoma of the prostate—recovered from the operation. He remarked that age did not seem to be a contraindication to the operation, provided the functional integrity of the kidneys was preserved.

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[1] Journal of the American Medical Association, 1905, p. 337.

[2] London Lancet, 1905, p. 1268.

Harrison and other surgeons also expressed their preference for the suprapubic operation.

The April number of the *Annals of Surgery* is devoted to a symposium on the etiology and surgical treatment of prostatic hypertrophy. Eleven papers are comprised in the symposium; noteworthy is the earnest advocacy, by Lilienthal and Wiener, of the suprapubic operation and of nitrous oxide anæsthesia for that purpose.

Tinker[1] advises the performance of perineal prostatectomy under local anæsthesia, whereby the dangers of chloroform and ether are eliminated. He secures this by infiltration around the main nerve trunks:

"Taking the tuberosity of the ischium as a landmark, the needle of the infiltrating syringe is inserted into the skin about one inch in front and internal to the tuberosity. It is not necessary to infiltrate a large area in this region, and the weaker solution of eucaine, 1:500, with adrenalin is used to infiltrate the skin and outer layers." Then 30 to 60 minims of a stronger solution are injected more deeply.

The region around the bladder neck is not anæsthetized by this procedure, and the author recommends that nitrous oxide anæsthesia be used for this stage.

It would seem that the latter suffices for all stages, without the disadvantages of the infiltration.

Whiteside[2] presented to the American Urological Association a paper entitled "Some Untoward Results of Perineal Prostatectomy," which is heartily commended for perusal by both surgeons and practitioners. He carefully analyzes several series of cases, some published in current literature and others collected by personal communications. His conclusions from this analysis of 238 cases (and 22 further cases presented in an appendix) are these:

1. Perineal prostatectomy is considered by the majority of surgeons the best operation in most cases in spite of the excellent results from the suprapubic operation reported by Freyer, Fuller, Lilienthal and many others.

2. Immediate deaths result from sepsis, shock, cardiac disease, pneumonia, and uræmia; remote deaths from cancer, cachexia, pyonephrosis,

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[1] Journal of the American Medical Association, 1905, p. 471.

[2] Journal of Urology, July and August, 1905.

uræmia, embolism, and the results of secondary operations to overcome defects left by the first.

3. Absolutely good results occur in about 30 per cent. of all cases operated on.

4. Sequelæ are numerous and troublesome; they include rectal fistula, urinary sinus, abscess, stricture at the bladder neck, incontinence, residual urine, epididymitis, sexual impotence, cystitis, vesical calculus, and urinary tuberculosis.

5. Mistakes in diagnosis are not uncommon even in the experience of the most skilful; carcinoma, sarcoma, and syphilis have all proved stumbling-blocks.

"Is this as good as the enthusiasm of a few would lead us to suppose?" "Would you eagerly embrace an operation offering you a 30 per cent. chance of cure, a 7 per cent. or more chance of death, and, more important still, a 50 per cent. chance that you would be no better but have only exchanged one urinary difficulty for another?" "It is wrong to persuade ourselves or our patients that it is easy, safe, and sure to cure."

Whiteside's article should contribute materially to check the indiscriminate, reckless, and ignorant vogue of perineal prostatectomy which has swept the profession of this country in the last few years. Perineal prostatectomy will doubtless have a permanent place among the operative measures for the relief of prostatic hypertrophy; and when its limitations are well understood and generally observed, the untoward results now so common will be minimized.

Summary. At present perineal prostatectomy is the operation of choice in France, Germany, and the United States. It is generally admitted that it has produced a large army of sufferers from urinary incontinence, perineal and rectal fistulæ, cicatricial contractions of the bladder neck, besides various minor ailments, such as impotence and epididymitis. It is also generally admitted that the suprapubic operation entails none of these distressing sequelæ; and that the functional results secured by it are more uniformly good than are those of the perineal operation.

Why, then, is the latter generally preferred? The unanimous answer is, because of its smaller mortality.

The correctness of this answer cannot be denied; and the chief cause of the preponderant mortality of the high operation has been sepsis from infection of the suprapubic space.

It is possible, however, to reduce this mortality below that of the perineal operation by eliminating this suprapubic infection. This is accomplished by performing the operation in two stages, each under nitrous oxide anæsthesia. As above stated, I have operated in this way on twelve elderly patients without a death.

A third safeguard is the perineal boutonnière with drainage through a metal tube; this is useful also for the detection and dilatation of the sclerosis at the vesical orifice, which is so often an important factor in the retention.

A fourth protection against sepsis is packing the bladder with strips of iodoform gauze, whose ends emerge from the suprapubic or perineal wound.

By these measures the mortality from the suprapubic operation is minimized; and this operation should supplant the perineal as the routine procedure.

PROSTATISM WITHOUT PROSTATIC ENLARGEMENT. In former issues of this review emphasis has been laid upon the fact that all the symptoms commonly ascribed to prostatic hypertrophy are frequently met in patients whose prostates are not enlarged from any cause, in whom the obstruction to urination is a sclerosis, a "contracture" of the vesical neck; and that while these cases are met at all ages and even in women, they are especially common in elderly men during the period when actual hypertrophy is also common. Hence, they are usually mistaken for instances of prostatic hypertrophy and subjected to operation.

Occasionally surgeons who have made this mistake publish their experiences for the benefit and guidance of others.

Such a case is recorded by Moran,[1] who made a suprapubic incision for the purpose of removing a prostatic enlargement in a patient sixty-five years old. He found absolutely no enlargement; but the bas-fond of the bladder was very large and deep, indicating that some obstruction to urination existed. This obstruction he found in a hard, sclerosed vesical orifice, which he divided by the cautery. The patient recovered perfect vesical function.

Reynes related a duplicate of the above-mentioned case in his own experience, the patient having been unable to void any urine except through a catheter for six months prior to the operation; this revealed a sclerosis of the vesical neck without hypertrophy.

Further examples of the errors caused by the prevalent practice of regarding prostatic hypertrophy as the cause of all urinary difficulties in elderly men were furnished by Loumcan at the same meeting of the French Urological Association. He mentioned one instance in which a supposed prostatic enlargement proved to be a greatly thickened bladder; and another where excrescences perceived on rectal examination and supposed to be cancerous nodules of the prostate were found to be diverticula of the bladder.

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[1] Annales des maladies des organes genitourinaries, 1904, p. 1523.

THE EXTERNAL GENITALS.

Resection of the Urethra. Goldmann[1] has resected the urethra for gonorrhœal and other strictures, removing as much as 6 cm. (2½ inches) of the canal, and closing the defect successfully. He mobilizes the urethral stumps and stretches them thoroughly.

Infections of the Bulbous Urethra. Motz discussed before the French Urological Association the chronic inflammation of the glands in the bulbous and membranous urethra; the persistence of a gleet is frequently due to the infection of this region. It can be mistaken for infection of the prostatic follicles, since pus can be expressed by pressure with the finger in the rectum. Treatment should be directed to these parts of the urethra specifically.

Simple Ulcer of the Bulbous Urethra is considered by Keyes, Jr.,[2] in connection with the following case: A man, aged forty-four years, free from gonorrhœa and syphilis, had for three years had a slight glairy mucous discharge; for six months there had been some bleeding after urination, though the urine was free from blood; the urinary stream was tardy at the start and dribbling at the finish, though not unduly frequent. A physician had used internal remedies and injections, the latter followed by increased bleeding. Then the urethroscope revealed an ulcer in the bulbous urethra; strong silver nitrate solutions were followed by more bleeding and retention of urine, a soft catheter failing to enter.

The patient then consulted Keyes, who was unable to inspect the urethra because of the bleeding induced by the urethroscope. A 26 F. steel sound was passed; bleeding followed, but urination improved. Six days later an ulcer nearly 1 cm. long was seen on the roof of the urethra at the bulbomembranous junction; the same sound again caused bleeding. Eight days later a 29 F. sound caused bleeding for ten hours, but none occurred thereafter.

Keyes regards this condition as similar to ananal fissure, and, like the latter, cured by overdistention. He collects 24 personal cases similar to this except for the bleeding; the symptoms are usually these: A neurotic or overworked patient has frequent urination by day but not at night, and a dull, hypogastric ache which is relieved by urination, the latter being often imperative. The urine is clear or contains a mucopurulent cloud. The passage of a large sound produces distinct improvement and often excites bleeding. Relapses are not uncommon.

While one may hesitate to accept an ulcer or fissure of the bulbous urethra as the usual cause of these symptoms, the clinical picture and the relief of symptoms by large sounds are familiar phenomena.

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[1] Beiträge zur klin. Chirurgie, Bd. xlvii., No. 1.

[2] American Journal of Urology, March, 1905.

Circular Constriction of the Penis with resultant fistula is reviewed by Veau[1] in reporting a case. Falconnet collected 16 such cases, mostly in children and imbecile or insane adults. The important clinical feature is that the œdema caused by the constricting agent, such as a ring, may conceal the latter for weeks.

Suppuration of the Testicle is the subject of an extensive article by Dalous,[2] dealing with the etiology and especially with the pathological histology. He advises that the quickest and surest cure for any non-tuberculous infection of the epididymis is total and systematic epididymectomy.

Direct Medication of Seminal Vesicle Infections is described by Belfield.[3] Pus infections of the genital tubes in the male are common; the gonococcus infection, when it invades the epididymis, frequently produces suppuration along the entire genital canal and a small abscess in the epididymis; the latter may be affirmed whenever an acute epididymitis is accompanied with hydrocele and scrotal œdema, and often exists without these incidental symptoms. The logical and, as events prove, the successful treatment consists of incision and drainage of the suppurating epididymis. The vas deferens is accessible through such an incision. After demonstrating on the cadaver the feasibility of the plan he introduced a hypodermic needle into the lumen of the vas and injected various solutions along that canal into the seminal vesicle. This organ can then be emptied by digital massage through the rectum and additional injections made.

It was found too that such irrigation of the vas deferens and seminal vesicle were useful in the treatment of chronic conditions resulting from infections, including some cases of gleet. The one precaution to be observed is to avoid overdistention of the vesicles, since this may induce a painful spasm.

The objection to this treatment is that the vas deferens must be exposed by means of a small incision, which can of course be made under local cocaine anæsthesia. While this seems a drawback, yet it is a trivial one when the benefits to be secured are taken into consideration, together with the fact that the seminal vesicle cannot be medicated directly in any other way, severe operations excepted. The fact that gonorrhœal and other pus infections of the male genital tube—unlike pus tubes in the female—rarely result in death or permanent disability, is doubtless the reason why the nominal treatment by medical means only has heretofore prevailed. Yet the male subject of pus tubes suffers serious distress and functional derangements, including gleet, perineal, rectal, and suprapubic pain, irritation of the bladder, sterility, and impotence; and a method of treatment which offers an excellent opportunity of eradicating these infections of the genital tube and the consequences above enumerated will doubtless be welcomed even though it requires a slight incision through the skin.

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[1] Annales des maladies des organes genitourinaries, 1904, p. 1417.

[2] Ibid., 1905, p. 984.

[3] Journal of the American Medical Association, 1905, p. 1277.

X-ray Treatment of Tuberculous Testicle. De Garmo[1] reports a case of extensive tuberculosis of the testicle treated by *x*-ray exposures; 126 treatments lasting ten minutes each were given during ten months. Complete healing resulted, with no sign of recurrence during two years following.

Infections of the Urinary Tract. Guyon[2] devotes a clinical lecture to a discussion of the dangers to the organism inherent in pus infections of the urinary tract; and emphasizes a warning against the performance of major operations on the kidney, bladder, or prostate when severe infections of the urinary channels exist. The latter should be removed by internal urinary sterilizers, such as urotropin, by lavage of the bladder and prostate with silver nitrate solution or other antiseptic, and by drainage through the retained catheter before such operations are undertaken.

PNEUMOCOCCUS INFECTION. Picker[3] reviews the literature concerning the pneumococcus as a denizen of the genitourinary tract. It is generally pathogenic, though some cases of apparent harmlessness have been observed. He also reports a case of urethral infection with the pneumococcus, the pus discharge appearing three days after a suspicious intercourse.

STAPHYLOCOCCUS ALBUS INFECTIONS. An infection of the urethra by the white staphylococcus, identified by cultures, has recently been under my own observation. The pus discharge, never profuse, appeared within a week after exposure with a woman of apparent genital health; no gonococci were discovered in either person, nor was there a history of such infection in either.

PUS INFECTIONS OF THE URINARY TRACT SECONDARY TO SKIN LESIONS. Jordan has operated on 12 cases of renal or perirenal abscess following boils or other small peripheral foci. He remarks upon the difficulty of distinguishing infections of such obscure origin from typhoid infection, appendicitis, and liver abscess; it is probably confused with some of the latter.

Israel says that such abscesses appear consecutively to nasal catarrh.

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[1] Medical Record, April 15, 1905.

[2] Annales des maladies des organes genitourinaries, 1904, No. 22.

[3] Centralblatt f. Krankheiten d. Harn. u. Sexual Organe, 1905, p. 133.

DIFFERENTIATION BETWEEN TUBERCLE AND SMEGMA BACILLI. Young and Churchman[1] review the various staining and culture methods that have been furnished for distinguishing the tubercle from the smegma bacilli in the urine, and reject them all as unreliable. They affirm that the only satisfactory procedure consists in the thorough removal of the smegma bacilli from the urinary channel prior to securing the specimen for examination. Since the smegma bacillus is often found in the anterior urethra, but rarely beyond the bulb, this channel should be thoroughly irrigated as far back as the bulb, after which a clean catheter may be introduced into the bladder. Bacilli found in the urine so procured, which present the known reactions of the tubercle bacillus, may be identified as the latter with confidence.

Anatomy and Physiology. Guyon[2] discusses the sensibility of the bladder in health and disease, emphasizing the distinction between sensibility to contact and to distention. Under chloroform anæsthesia sensibility to contact is abolished, but that to distention is reduced only a little in health and not at all in disease. Hence distention of the diseased bladder should be scrupulously avoided. By preliminary treatment, whereby cystitis is reduced, greater distention can be safely made, and less chloroform is needed.

Hogge[3] presents an elaborate and exhaustive study of the anatomy, physiology, and development of the muscles of the perineum.

CLINICAL ANATOMY OF THE TRIGONUM. Whiteside[4] and Uteau[5] have studied the anatomy of the trigonum with reference to its clinical applications. It is often found to be remarkably narrow, a feature which makes ureter catheterism difficult and renders the various segregators wholly unreliable. This narrowness is also an argument in favor of suprapubic as against perineal prostatectomy. The relations of the trigonum are not changed by prostatic hypertrophy, but are apt to be by uterine displacements.

Sterility from the X-ray. In 1903 Albers-Schoenberg[6] published the results of experiments on animals showing that exposure of the testicles to the x-ray for certain periods caused azoöspermia through arrest of the spermatogenic function of the testes. He exposed 5 male rabbits and 6 male guinea-pigs to the rays for total periods of 195 to 377 minutes, divided into sittings of 15 to 40 minutes each at intervals of seven to twenty-seven days. All these males were then given ample opportunity for copulation with unexposed and normal females for periods of several weeks, and although these males showed the sexual desire and potence usual to their species, not a single female was fertilized.

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[1] American Journal of the Medical Sciences, July, 1905.

[2] Annales des maladies des organes genitourinaries, 1905, No. 32.

[3] Ibid., 1905, No. 14.

[4] Portland Medical Gazette, November, 1904.

[5] Annales des maladies des organes genitourinaries, 1905, No. 4.

[6] Münchener med. Wochenschrift, 1903, No. 43.

Eight of these males were killed and their sexual organs examined; in 1 (which had received the least x-ray exposures) a few spermatozoa were discovered, while in the remaining 7 no evidence of spermatozoön formation was found. Whether this sterility was transient or permanent was not determined beyond ascertaining that 2 of the exposed males failed to impregnate females during four and one-half months after cessation of the exposures.

Bergoiné and Tribondeau[1] observed similar results from exposure of male white rats to the Roentgen rays. They also report[2] as the result of their histological studies of the testes so treated that the seminal epithelium encloses two kinds of cells specialized in function, one forming the spermatogons, while the second assures the nutrition of the first. It is the former cells that are destroyed by the x-ray. The testicles of the exposed animals are usually diminished in size and consistence, being sometimes only two-thirds their normal size and noticeably softened.

Halberstaedter[3] found that in the ovaries of rabbits exposed to the x-rays the Graafian follicles were obliterated, replaced by homogeneous masses in which the remains of nuclei could be occasionally recognized He thinks that the ovaries of rabbits are more sensitive to the destructive effects of the rays than are the testes.

The effects of the x-ray upon the spermatic function in the human subject were noted in two cases by Philipp.[4] In one the testes were exposed ten to fifteen minutes daily for thirty days, a total exposure of 365 minutes; at the end of this time the semen contained as many motile spermatozoa as at the beginning. The second patient was treated by the x-ray for pruritus ani, receiving 195 minutes' exposure in twenty days. Seven months later the semen contained no spermatozoa.

Brown[5] reports that every one of eighteen manipulators of x-ray generators for several years past, whose semen he has examined, show complete or almost complete azoöspermia. The subjects were men in robust health, ranging in age from twenty-two to forty years, and none has observed any tendency toward impotence. Half of them are married, and none of these has begotten a child since beginning x-ray work. The testes seem normal in size and consistence; the semen rather less abundant, but in all cases that have been exposed to the x-ray for considerable periods contains no spermatozoa.

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[1] Comptes rendus, 1904, p. 400 *et seq.*

[2] Ibid., 1905, April 8.

[3] Berliner klin. Wochenschrift, January 16, 1905.

[4] Fortschritte auf dem Gebiete d. Roentgenstrahlen, 1904, Bd. viii.

[5] American Journal of Surgery, April, 1905.

The author quotes also a case in which a man, aged twenty-nine years, after furnishing semen found to contain many active spermatozoa, received two *x*-ray exposures of ten to fifteen minutes each for pruritus ani, the scrotum being protected; the semen examined after these exposures contained many spermatozoa devoid of motion. Three weeks later two more exposures were given, after which two examinations of semen showed complete absence of spermatozoa. Five months later the semen contained large numbers of active spermatozoa. There were no appreciable changes in the testes or epididymes.

It seems apparent then that exposure to the *x*-rays of the genital organs may produce sterility in the human subject, and that these organs of all persons exposed to the rays should be protected from these emanations by leaden or other shields. Observations upon animals make it probable that the human female is quite as liable to sterility from these exposures as the male has been shown to be

DISEASES OF THE KIDNEYS.

By JOHN ROSE BRADFORD, M.D.

Glomerular Lesions of Diffuse Nephritis. Herringham and Thursfield[1] have studied the lesions in the glomeruli in 30 cases of diffuse nephritis which were observed clinically and where the diagnosis of diffuse nephritis was arrived at from a consideration of the clinical facts as well as of the morbid anatomy. In 2 cases out of the 30 no evidence of disease of the glomeruli was found. In the others there was a great variation in the extent to which the glomeruli were involved. In some cases only a few were affected and in others hardly a single healthy glomerulus could be found. The authors do not think that there is a separate type of the disease to be recognized as glomerular nephritis, and they regard glomerular changes as an essential part of the morbid anatomy of diffuse nephritis.

This conclusion is in harmony with the experience of most authors that the division of nephritis into glomerular, tubal, and interstitial is really artificial and that really all the elements of the kidney are usually involved, although it may well be that the degree of involvement of the different renal elements is unequal in different forms of nephritis. Herringham and Thursfield consider that a number of epithelial cells collect between the parietal and visceral layer of epithelium lining the glomerular capsule. They regard these cells as epithelial owing to their size, their staining reaction, and because the cells of the parietal layer of the glomerular epithelium show signs of division.

The authors consider that in different cases of nephritis the arrangement of these proliferated cells undergoes some variation and they recognize four forms. In the first all the cells lie in a confused mass within the capsular space. In the second the inner cells show a tendency to a concentric arrangement. In the third all or nearly all the cells are arranged in layers, but only some of the cells are long and flattened out. In the fourth form all the cells are in layers and all are elongated and thin. A liquid effusion of an inflammatory character always lies around and between the cells. According to the authors lymph is present in the effusion, but it does not give the staining reaction of fibrin. The visceral layer of the capsule is often torn off from the tuft owing to the shrinkage produced by hardening reagents. The presence of the inflammatory effusion, together with the different manner in which the cells may be arranged, produce the appearances that have been considered to suggest that true connective tissue is being formed.

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[1] Transactions of the Pathological Society, 1904.

The authors consider that at first an ordinary inflammation of epithelium occurs and that the gradual transformation of the products of this inflammation occurs without any additional new factor, and they have been unable to observe any invasion of the capsule by small round cells. They consider that the pressure exercised by the blood in the capillary tuft is the agent that produces the concentric lamination and the flattening of the cells of the tuft. When the effusion first takes place no doubt the tuft is compressed, but as the inflammation subsides they think the blood pressure tends to re-expand the tuft and so compresses the capsular contents against the outer wall, and the greater the expansion of the tuft the greater the degree of lamination of the inflammatory products within the capsule.

They also consider it is probable that in all cases where effusion takes place the capillary wall sustains some damage, although this may not be recognizable. As a rule, this damage is insufficient to cause the death of the tuft and with the subsidence of the inflammation the circulation is re-established. In other instances the damage inflicted is greater and the glomerulus remains simply as a homogeneous matrix with a few cells scattered in it but with no trace of the epithelial capsule or of the capillaries. The process of degeneration is apparently gradual, since sometimes one loop alone is affected, and in other instances all the outer portions of the tuft are involved while the central portion remains unaffected. Ultimately, when the degeneration is complete the coalescence of the degenerate tuft with the inflammatory products produces a structureless mass surrounded by fibrous tissue. The degeneration of the capillary tuft has usually been looked upon as a sequel of pressure upon the tuft or as a result of arterial occlusion. Herringham and Thursfield have been unable to find any evidence in support of either of these views, and they consider that no mechanical cause will account for the degeneration but that it is dependent on the action of a chemical or bacterial poison.

Syphilitic Nephritis. Syphilis, like other infective diseases, may not only give rise to nephritis but this complication may occur at different periods after the initial infection, and, further, very different forms of nephritis may be produced. It is only comparatively recently that the importance of syphilis as an etiological factor in the production of nephritis has been recognized, and just as formerly many cases of myelitis really due to syphilis were imputed to other causes, so now syphilitic nephritis is not always recognized as such, although really the type of the disease is often very characteristic.

The recognition of the specific character of the nephritis is of importance both from the prognostic and therapeutic point of view. It is not uncommon for the severity of the renal symptoms to lead to a grave prognosis being given, when in the course of time this is falsified by the complete subsidence of the albuminuria. Syphilitic nephritis is often characterized by the presence of a very intense albuminuria unaccompanied by some of the other features of renal disease, such as dropsy. There is probably no form of nephritis where the percentage amount of albumin in the urine is higher than in some forms of syphilitic nephritis. This intense albuminuria may persist for weeks or even for months and then subside completely. Although such a subsidence is perhaps not unknown in other forms of nephritis, it is certainly very infrequent except in syphilitic nephritis. Dropsy may or may not be present and is certainly frequently absent. The other phenomena of severe renal disease, such as uræmia and cardiovascular changes, may be present in severe cases, but cardiovascular lesions, such as dilatation of the heart and cardiac hypertrophy and high tension, are certainly not invariably present even in cases of prolonged duration.

Nephritis may complicate syphilis at different periods after the initial infection. Thus a nephritis of varying degrees of severity is not uncommon a few weeks after infection and associated with the secondary rash. This form of the disease is generally recognized owing to the association with conspicuous syphilitic lesions, but nephritis may occur later and especially during the first two years after infection, and more especially during the first year. This is the form of the malady which is characterized by the intense albuminuria and the one where in the absence of a complete history its real nature is apt to be overlooked. In addition to these two forms of nephritis, corresponding fairly well with the similar forms seen after scarlet fever and other infective diseases, it is probable that cirrhosis of the kidney may sometimes also be of specific origin inasmuch as interstitial nephritis has been observed in cases of congenital syphilis.

Josserand[1] discusses the *treatment of syphilitic nephritis*. He also emphasizes the importance of recognizing that the nephritis occurs usually within the first year and that its onset is insidious with lassitude, headache, and possibly slight œdema; that the albuminuria is remarkable from its abundance and that over a hundred grams may be passed in the twenty-four hours. In cases where the nature of the disease is not recognized, and hence suitable treatment withheld, death may occur from uræmia. The specific nature of this renal lesion admits of no doubt, although some authors have suggested that the nephritis is not really of syphilitic origin but is dependent on mercurial poisoning. This, however, is completely disproved by the fact that such nephritis may arise in cases of syphilis that have not been treated at all. The specific character of the later renal complications, such as granular kidney, is much more open to question as the etiology in such cases is very often complex. As Josserand points out, it is most important to recognize the specific nature of the nephritis occurring during the secondary stage of syphilis, as it must be treated thoroughly either with mercury or, as Fournier has recommended, with mercury and potassium iodide.

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[1] Lyon médical, November, 1904.

The mercurial treatment of specific nephritis is followed by a very considerable measure of success, just as it is in cases of myelitis occurring at a similar period of the infection. At the same time it must be recognized, as Josserand points out, that all cases of syphilitic nephritis, even when occurring during the secondary period, are not curable and that in some death occurs from uræmia, and in others the albuminuria, although greatly diminished in amount, yet persists in a slighter degree. Notwithstanding these facts the mercurial treatment of specific nephritis is certainly followed by a greater measure of success than is seen in the treatment of other forms of nephritis complicating other infective diseases. The mercurial treatment of the late or tertiary renal lesions is not followed by success, and in this respect the renal lesions present considerable resemblance to the lesions of the nervous system associated with syphilis, since it is generally recognized that whereas the mercurial treatment of myelitis or even of hemiplegia occurring during the secondary stage is very successful the similar treatment of tabes or of general paralysis is not very successful.

Although the administration of mercury is the essential factor in the treatment of specific nephritis, the other usual dietetic measures must also be employed, and it is well to restrict the diet to milk, at any rate for a few weeks at the onset of the malady. In cases where the albuminuria is not only very abundant but also persistent, and where, therefore, the loss of proteid matter to the organism is considerable, it will often be advisable to increase the diet, as such increase is very often not followed by any corresponding increase in the albuminuria. Measures should also be employed to prevent any overdistention of the vascular system, as it is not uncommon for considerable circulatory embarrassment due to cardiac dilatation to occur in this malady. Simple saline purgatives are, on the whole, the most suitable agents for this purpose.

Kidney Extracts. Although the evidence of the existence of an internal renal secretion has not been strengthened of late years, nevertheless methods of treating renal disease by kidney extracts are from time to time brought forward. The results obtained are most contradictory, both clinically and experimentally, but it must be admitted that the difficulties in gauging results are greater in the case of the kidney than with some other glands. The impairment of the excretory function of the kidney in disease of this organ will necessarily prevent results being obtained at all analogous with those seen in the case of the thyroid body, even if the existence of an internal renal secretion were established. Such results as have been obtained with the use of renal extracts have usually been the mitigation of uræmic symptoms, and inasmuch as the course of uræmia is most uncertain, this among other reasons has led to a good deal of skepticism as to the efficiency of renal extracts. Further, the work in recent years on cytotoxins has established at any rate that renal extracts are also capable of producing toxic effects on the kidney and other organs, and many observers have asserted that the use of renal extracts after double nephrectomy in animals tends rather to hasten death than to prolong life.

Arnozan[1] has summed up the knowledge to that date (1903) as to the action of renal extracts, and he states that hitherto, although some of the symptoms of uræmia may from time to time have been relieved, there is no instance known either of the cure of chronic Bright's disease or of the disappearance of albuminuria following the administration of raw kidneys or of glycerin extracts, and, further, that there is a considerable amount of evidence to show that these extracts may be definitely toxic and exert a special toxic action on the kidneys. Although this conclusion will probably be in accord with the views of most authorities on the subject, very different results have been claimed by Renaut.[2]

Renaut and his pupil Choupin[3] claim that by the use of a different method very striking results may be obtained in the treatment of chronic renal disease by kidney extracts. These authors are not in favor of the use of the actual kidney substance or of glycerin extracts. The former they point out is not well tolerated if given raw and may be distinctly toxic, and they consider that glycerin extracts may undergo very considerable changes in the course of preparation, and, further, that the glycerin extracts usually contain only a very small quantity of the supposed active constituent. Renaut advocated the use of a watery extract of the fresh kidney prepared by maceration of the organ, and his usual method is to take usually two kidneys of the pig absolutely fresh. The capsule is removed and the organ minced and subsequently washed in distilled water to remove the urine. In some instances he has used only the cortex of the organ, as he considers that the active principle of the internal secretion is only found here. According to Renaut it is essential to use the kidney of an omniverous animal like the pig rather than that of an herbivorous animal. The minced kidney is then pulped in a mortar with 450 c.c. of a 0.7 per cent. solution of sodium chloride. The mixture is allowed to stand surrounded by ice for four hours and is then decanted. The extract, which according to Renaut has no unpleasant taste, is flavored with a little luke-warm soup and is then administered to the patient.

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[1] Gazette des sciences médicales, Bordeaux, 1903.

[2] Académie de médecine, 1903.

[3] Revue de médecine, 1905.

Renaut and Choupin give the maceration daily for ten consecutive days and then it should be omitted for four or five days. If this is not done unpleasant symptoms, such as papular eruptions, nausea, and vomiting may occur. But if administered according to these directions with periods of intermission, they state that it is well borne. Syrup of lemons may be mixed with it to make the preparation more agreeable. The authors state that two kidneys a day should be given for the ten days, and that it is essential that the maceration only should be employed and that none of the pulp of the minced kidney should be given.

Choupin records the general results hitherto obtained by the use of renal extracts and mentions the cases recorded by some eleven writers, in all of which some improvement followed the use of renal extracts. The renal lesions present were varied; in some there was eclampsia, in others suppurative nephritis, and in others chronic nephritis.

Choupin also records in detail 2 cases of his own which were treated with the extract prepared by maceration according to Renaud's method. The first case was one of renal disease secondary to cardiac dilatation, where dyspnœa and œdema with a scanty excretion of urine, together with considerable albuminuria, were present. The use of the fresh extract was followed by a great increase in the quantity of urine and a corresponding diminution in the albuminuria and dropsy. The renal extract was used in the treatment of this case with periods of intermission for between three and four months and the final report of the case showed that very distinct improvement had apparently been produced. The success of the treatment was all the more marked, inasmuch as the patient had failed to respond to the ordinary routine treatment commonly prescribed for such cases. Further, the patient's health has remained satisfactory notwithstanding the cessation of the treatment. The second case treated by Choupin was one of interstitial nephritis with generalized dropsy, cardiac hypertrophy, and enlarged liver. Further, the patient had very marked uræmic symptoms and was an unfavorable subject owing to alcoholic habits. In this patient other forms of renal extract had been employed, more especially a bouillon prepared from kidneys which had failed to produce any beneficial effect. Treatment with the extract prepared by maceration was here also followed by a notable increase in the quantity of urine and a diminution of the œdema and of the uræmic symptoms. The extract, both in this patient and in others, caused copious perspirations of a urinous odor. The improvement produced by the treatment was such that the patient, who was apparently moribund when it was started, was able to get up and go out and attend to his business. The improvement was maintained for over three months, but subsequently to this a return of uræmic symptoms occurred and the patient ultimately died. The author states that the toleration of the extract was perfect, that no eruptions were produced but that copious perspiration with a urinous odor were produced at first. A marked diuretic effect was also produced and, thanks to this, the œdema disappeared and all uræmic symptoms cleared up. He considers that the success of the treatment was such that the patient was led to believe that he was quite well and thus was guilty of various imprudences which ultimately led to his death. Choupin further considers that this case proves the inefficiency of renal extracts which have been heated and prepared by other methods.

If would seem from these results that an extract prepared from the kidneys according to Renaut's method is at any rate capable of relieving the dropsy and some of the symptoms of uræmia, but many more observations will be required before there is sufficient evidence in favor of the use of such treatment, especially when we bear in mind, as already mentioned, the evidence as to the toxic action of extracts prepared from the organs of one animal and then injected into the circulation of another. It is, of course, possible that the administration of the extract by the stomach may prevent the manifestation of such toxic actions, and it is well known that the thyroid extract at any rate produces all its beneficial results when administered by the mouth.

Dechloridation in Renal Disease. There is at the present time a considerable difference of opinion with reference to the value in the treatment of renal disease, and especially of nephritis, of withholding chlorides in the diet. Some authors consider that in certain stages of nephritis the kidney is not only unable to excrete the full amount of chlorides, but that this is a measure of the physiological activity of the renal epithelium, and that by observations on the elimination of the chlorides valuable information can be obtained as to the efficiency of the renal filter. The retention of chlorides has other effects which are even of greater importance, according to these writers, inasmuch as the retention of chlorides is commonly synchronous with an increase in dropsy. There can be little doubt that there is an inverse relationship between the excretion of chlorides in the urine and the development of dropsy.

Dickinson pointed out many years ago that the œdema fluid of renal disease was rich in saline ingredients, and thus it can be readily understood that the excretion of chlorides in the urine must necessarily undergo a diminution at a time when dropsy is increasing. Modern writers have, however, looked upon the diminution of the chlorides in the urine not only as associated with the retention of these substances in the body, but as the cause of the retention. This view is based mainly on the fact that the administration of increased quantities of common salt in the diet is not followed by any adequate excretion of chloride in the urine. Further, the administration of food, rich in salt, has apparently been followed by increase in the amount of dropsical effusion, and this has been especially marked in cases of renal disease, but has also been observed in effusions due to other causes, as, for instance, cardiac œdema and ascitic collections. Finally, the restriction or diminution in the amount of common salt in food is reputed in many instances to have been followed by a rapid subsidence in the dropsical effusions.

Javal[1] considers the indications for this treatment in Bright's disease. Retention of chlorides in cases of Bright's disease is by no means constant, and even in the same case there may be considerable fluctuations in the degree of the impermeability of the kidney for chlorides from time to time. In some patients this impermeability is very considerable but temporary in duration, in others it is slighter in amount but may last for months. Javal points out that in ordinary practice it is impossible to make daily quantitative examinations of the urine for chlorides, and he seems to be of the opinion that daily weighing of the patient is sufficient.

Patients with Bright's disease suffering from dropsy undergo great fluctuations in their body weight, and these variations are frequently so large as to be obviously dependent on the increase or diminution in the amount of dropsy. Inasmuch as Javal, in common with some others, looks upon the dropsy as directly dependent on the chloride retention, and the chloride retention as due to the renal impermeability for chlorides, it follows according to this view that variations in the body weight may afford a very rough criterion or measure of the degree of chloride retention present.

Javal records a case carefully observed where observations were made on a patient suffering from chronic Bright's disease with anasarca and where the amount of chlorides in the food and in the urine were directly estimated and the variations in the dropsy noted. This patient on an ordinary diet, and taking about 15 gm. (225 gr.) of sodium chloride per diem, excreted some 7.3 gm. (110 gr.), and during this period the œdema increased. The administration of a diuretic such as theobromine increased the excretion of chlorides but did not lead to any diminution in the dropsy, on the contrary this still increased. The administration of medicines was then stopped and a diet administered containing as little salt as possible. This diet consisted of 300 gm. of bread, beef, and potatoes, the bread and potatoes containing no salt. The amount of salt in the food in twenty-four hours was estimated to be 1.5 gm. (22 gr.). The amount passed in the urine was some 10 gm. (150 gr.) per diem. On this treatment in four days the œdema had remarkably diminished, and when in addition to this diet theobromine was also administered, the excretion of chlorides was still further increased and the dropsy became rapidly less. The improvement was maintained and observations subsequently made showed no evidence of chloride retention and the patient was able to take an ordinary diet and remained in good health without any anasarca three months after the onset of the dropsy.

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[1] International Clinics, 1905, vol. iv.

In a second case recorded by Javal the diminished chloride excretion was very much more persistent, and here the dropsy also persisted. These cases show clearly the inverse relationship existing between dropsy and the amount of chlorides in the urine, the diminution in the chloride, being accompanied by an increase in the dropsy, and *vice versa.* We need not perhaps accept the view that the chloride retention is actually the cause of the dropsy. Still, it would certainly seem that a chloride-free diet in some cases has very marked effects in relieving the dropsy, and Javal points out that patients may be seen where the dropsy increases with a milk diet and diminishes when a diet of bread, meat, and potatoes, specially prepared and free from salt, is given.

Diuretics such as theobromine would seem to be of most use when associated with a chloride-free diet, and to be of comparatively little use when given with an ordinary salt diet. As Javal says, theobromine is able to increase the effect of the diet, but it cannot replace it. According to this author patients with Bright's disease with anasarca should be put on a chloride-free diet and very often all medication can then be avoided. Observations on the variations in the weight of the patient should be made and the diet adjusted according to the effects produced on the dropsy. Inasmuch as the dropsical fluid contains some 5 to 6 gm. (75 to 90 gr.) of sodium chloride per litre (quart) the variations in the weight of the patient will, as Javal states, give a rough measure of the chloride retention magnified between 160 and 200 times, since 5 to 6 gm. (75 to 90 gr.) of sodium chloride have to be retained in the body to lead to an increase of weight of 1 kg. (2.2 pounds) due to the presence of 1 litre (quart) of dropsical fluid. Although, as already mentioned, there may be some hesitation in accepting the view that dropsy of renal disease is solely and directly due to the retention of chlorides, there would certainly seem to be evidence that the administration of a diet poor in chlorides is a measure of distinct value in the treatment of renal dropsy, and it is probable that more benefit may often be obtained by such a diet in some cases than by the only too common practice of ordering a rigid milk diet in all cases of renal dropsy.

According to most authors the impermeability of the kidney to sodium chloride is a more or less specific one and not directly connected with impermeability to other urinary constituents. Thus, speaking generally, the granular kidney is more impermeable to most urinary constituents than the kidney of parenchymatous nephritis.

Bernard[1] recognizes two classes of nephritis: the interstitial with the so-called impermeable kidney, and the parenchymatous with the permeable kidney. Strauss' results, however, show that the cases of interstitial nephritis are really especially characterized by the retention of urea owing to its deficient elimination, and that in parenchymatous nephritis it is especially chloride of sodium that is retained. Claude has gone farther than this and has insisted on the fact that where there is a deficient elimination of sodium chloride the prognosis is especially grave.

Achard and Loeper[2] consider that retention of chlorides is seen especially in acute and subacute nephritis, that it is not present in granular kidney and in some other forms of chronic nephritis, but that it is almost always present in uræmia. This question of the retention of chlorides is of especial interest with reference to the pathology of dropsy. The older views that the dropsy of Bright's disease was dependent on mere suppression of urine or on a condition of hydræmic plethora have now been largely given up and the dropsy of renal disease is more and more correlated with the phenomena of osmosis.

The dropsy was first thought to be due to the diminution in the molecular concentration of the blood, and as a result of this the transference of fluid from the bloodvessels to the tissues. It is difficult on this theory to account for the increase of weight of patients who are becoming dropsical. Achard and others have attributed the œdema to the retention in the organism of substances which normally are excreted in the urine. These substances diffuse from the vessels into the tissues, and as a result there is an increased molecular concentration of the blood and tissue juices. In order for life to be maintained it is necessary that the normal equilibrium should be restored by dilution of the blood and tissue juices, and hence the water introduced into the organism is retained to dilute the blood and tissue juice. This theory affords a

[1] Archiv. général de médecine, 1903.

[2] Société médicale des hôpitaux, 1903.

ready explanation of the hydræmia, the dropsy, and the scanty secretion of urine.

More recently the observations of Laufer[1] have shown that in cases of Bright's disease the occurrence of anasarca is preceded by the retention of chlorides, and further that the mass of the blood undergoes an increase which shows itself by a heightening of the general arterial pressure. This increased arterial pressure has been observed by many of the older writers and was especially insisted on by Mahomed. According to Laufer the heightened blood pressure may be observed before the occurrence of the dropsy and also just before the time of the absorption of the dropsy, but it is not present when the dropsy appears or when polyuria is present. In parenchymatous nephritis the principal urinary salt retained is undoubtedly chloride of sodium, and inasmuch as the osmotic coefficient of this salt is greater than that of all the other urinary salts its retention leads to greater accumulation of water, and this is possibly the explanation of the fact that dropsy is more marked in parenchymatous than in interstitial nephritis.

Widal and Lemierre[2] have adduced some further evidence of the part played by sodium chloride in the production of renal dropsy. They have shown that if patients with parenchymatous nephritis take 10 gm. (150 gr.) of sodium chloride daily for a few days dropsy will supervene and the weight of the patient will undergo a steady increase owing to this retention of water. Further, that two stages may be recognized, the first marked by a mere increase in weight and the second by the actual appearance of œdema. If the administration of the salt is stopped a fall of weight occurs and the œdema diminishes or disappears. This administration of sodium chloride is never followed by the occurrence of œdema in cases of interstitial nephritis, and sometimes it fails even in parenchymatous nephritis. According to Widal and Lemierre the uncertainty in the result is entirely dependent on the rate of elimination of the chlorides by the kidneys. If these are freely eliminated no œdema occurs. On the other hand, if they are retained owing to deficient elimination the œdema is marked.

In addition to the above facts Courmont[3] has shown that the administration of sodium chloride to patients with renal disease when anasarca is present is by no means free from risk, not only may the dropsy be increased but this author is of opinion that uræmic symptoms may also be produced. If sodium chloride plays such an important part in the production of the dropsy of renal disease great care must be taken in the administration of this salt to these patients. The injurious effects of a meat diet in certain forms of renal disease have been attributed to very different causes; some have thought that the increased urea excretion was the harmful element, others that on a meat diet various toxic substances might be formed, but Widal and his pupils think the principal danger of a meat diet is the considerable quantity of chloride of sodium that is so often taken in association with a meat diet, and he advises that before any case of Bright's disease is dieted observations should be made on the elimination of chlorides, and further that in all patients with dropsy an albuminous diet free from salt should be given and that not uncommonly such a diet may produce better results than a pure milk diet. In cases where the dropsy is considerable or increasing this author recommends that water only should be given for one or two days and that in this way better results are obtained than by the administration of milk.

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[1] Société de biologie, 1904.

[2] Société médicale des hôpitaux.

[3] Lyon médical, 1903.

Tuberculosis of the Kidney. Jousset,[1] in writing on this subject, states that the progress of investigation has in recent years led to the conclusion that tuberculous infection of the kidney generally takes place through the bloodvessels. The old theory that tuberculous disease of the kidney was generally an ascending infection of the ureter or of the lymphatics does not now receive the support it formerly did. The presence of the bacillus of tubercle in the urine after the inoculation of this organism in the blood stream experimentally shows the close relationship existing between the urine and the general circulation. Jousset considers that a bacillary infection of the renal filter may take place with one or other of three different results. The bacillary infection may lead to the development (1) of specific lesions, (2) other lesions of a non-specific character may result, or (3) no lesions may be present.

1. BACILLARY INFECTION OF THE KIDNEY WITH THE DEVELOPMENT OF SPECIFIC LESIONS. Although formerly difficulties were experienced in producing tuberculous lesions of the kidney as a result of the inoculation with the tubercle bacillus, these difficulties have disappeared with modern methods. The inoculation if performed into an artery usually leads to the development of renal tuberculosis, but this more certainly results if the kidney at the same time is injured or irritated by some toxic substance. The tuberculous deposits follow the line of the arterioles and very frequently they are limited to the cortical region. Formerly renal tuberculosis was looked upon as due to an ascending infection owing to the frequent occurrence of unilateral lesions or to the fact that the lesion involves the medullary substance of the kidney Neither of these facts is really an objection to the view that the infection is usually a blood one. The deposit in the medulla of the kidney is

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[1] Archiv. de médecin experimentale, September. 1904.

really dependent on a secondary lymphatic affection from a primary focus in the cortex. The unilateral character of the lesion is not a real objection to arterial infection. If all tuberculous infection reaches the kidney through the arterial system it would follow that primary tuberculous disease of the kidney does not really exist and the cases apparently primary are really those in which the primary focus has been overlooked.

Jousset recognizes two forms of obvious renal tuberculosis, the nodular massive form and a second or miliary form. The nodular massive form is the one which used to be regarded as a result of an ascending infection. Jousset considers that it might be advisable to retain the term "primitive" for this form of the infection on the understanding that this term is simply used in a clinical sense and that really all renal tuberculosis is a descending hæmatogenous and secondary infection. This nodular form of tuberculosis usually leads to the production of pyelitis and produces the clinical picture that is well known as associated with tuberculous kidney. This form of the disease is, on the whole, rather uncommon.

The second form of renal tuberculosis where more or less numerous granulations are scattered through the organ is a disease that does not, as a rule, produce any symptoms and hence commonly is only discovered in the postmortem room. This form of the malady is seen under two conditions: first, as part of the general miliary tuberculosis, and secondly, toward the termination of pulmonary phthisis. The older statistics did not associate the presence of tubercles in the kidney with phthisis in a large proportion of cases, but more thorough observation in recent years have shown, according to Jousset, that in some 25 per cent. of the cases the kidneys of phthisical patients contain tuberculous granulations. Although a hard-and-fast line can be drawn between the typical cases of solitary masses of medullary tubercle on the one hand and the scattered granulations on the other, intermediary cases are seen in which both types of lesion are present.

2. Bacillary Infection of the Kidney with Non-specific Lesions. The kidneys of phthisical patients not only often present the lesions of a definite tuberculous character but very often present other lesions of a non-specific nature which are, however, definitely related to the pulmonary tuberculous disease. Various forms of nephritis are seen associated with phthisis and, although both tubular and interstitial nephritis may occur, Jousset considers that the most common type is a mixed one involving both the epithelial and interstitial tissue. In addition to this very definite and serious lesion other effects, such as congestion, hemorrhage, leukocytic infiltration, all essentially transitory lesions, are also found. Finally amyloid degeneration is also well

known to occur. Simple congestion with petechial hemorrhages is very often associated with phthisis. The leukocytic infiltration is a lesion of some interest, as sometimes it is the mode of origin of an interstitial nephritis and in other instances it would seem to be a definite tuberculous reaction.

The renal lesions associated with phthisis are so numerous and varied that different writers have attributed very different causes to their production, and have also regarded different renal lesions as the ones most commonly associated with the tuberculous disease of the lungs. A large number of authors, among them Johnson, looked upon chronic tubal nephritis as the most common lesion. This form of nephritis was characterized by the presence of well-marked and chronic lesions affecting especially the tubules. The lesions of the convoluted tubules, although necrotic, are quite different in character from mere fatty degeneration and the glomeruli are frequently intact. In this form of nephritis the lesions are essentially of a degenerative character.

Other authors have considered that fibrotic lesions of the kidney affecting mainly the interstitial substance are really more common than degenerative tubal lesions, and Bernhard[1] considers that interstitial nephritis is an extremely common lesion in cases of cured pulmonary tuberculosis. The lesion consists of a pure interstitial cirrhosis of the kidney, sometimes slight, sometimes severe, and presenting very close resemblance, if not actual identity, with the ordinary form of granular kidney seen after acute infections.

Jousset is of opinion that tuberculous nephritis is like other forms of the disease and therefore most commonly mixed, and that pure examples of either tubal or interstitial nephritis are rare and exceptional. The diversity of the lesions has led to the idea that many different causes are probably operative. Those forms where epithelial lesions are present have often attracted more attention owing to the clinical symptoms being more marked, whereas in the interstitial forms symptoms are often slight or absent. Considerable confusion has existed between the epithelial forms of nephritis on the one hand and amyloid degeneration on the other, and some writers have gone so far as to suppose that all cases of albuminuria in phthisis are associated with amyloid degeneration, but, as Jousset clearly shows, this is not the case and pure tubal lesions without any amyloid degeneration are not uncommon.

The frequent occurrence of necrotic changes in the renal cells and the well-known occurrence of this process in tuberculous lesions has led to the view that the renal lesions are produced by the action of the poison elaborated by the tubercle bacillus—*i. e.*, tuberculin—on the renal cells. In other words, according to this theory the renal lesions would be of a toxic origin and dependent on the circulation in the blood streams of the specific poison tuberculin. Jousset considers that the growth of the bacillus is so slow that it is improbable that sufficient quantities of the toxin would be produced to have these effects. Further, that if this were the cause all patients with phthisis would suffer from renal lesions and that the cases where extensive caseation were present would be those where the renal lesions would reach their highest degree of development, whereas this is not the case. Further, it would seem that the tissues of tuberculous patients do not contain any toxic substance that presents any close resemblance to the tuberculin found in cultures. The action of tuberculin on animals tends to produce congestion and hemorrhagic lesions of the kidney rather than degenerative.

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[1] Deutsch. med. Woch., 1897.

Jousset draws attention to the fact that in the cases of tuberculosis of the kidney where actual tuberculous granulations are present the cortical substance in the neighborhood of the granulations frequently presents appearances similar to those seen in the nephritis of phthisis; in other words, the so-called toxic nephritis may coexist with definite renal tuberculosis, and that it is especially well marked in the vicinity of the tubercles. For these reasons Jousset was led to the belief that the lesions might be dependent rather on the presence of the organisms themselves than on that of any toxic substance. In confirmation of this he has made some observations to determine whether the bacillus of tubercle could be found in the kidneys where nephritis was present in fatal cases of phthisis. In this search he has been successful, the inoculation method having been employed. Not only did Jousset find the bacillus of tubercle in cases where the renal lesion was associated with phthisis but also in at any rate one instance the bacillus of tubercle was found in a case of granular kidney where the body presented no signs of visceral or pulmonary tubercle. Five cases out of six examined in this way revealed the presence of the organism. In many cases of interstitial nephritis the organism has also been recovered from the kidney, and according to Jousset, a granular kidney may be found in something like 25 per cent. of cases.

Jousset finally draws attention to the fact that bacilluria—namely, the presence of the tubercle bacillus in the urine—may be found in cases of phthisis where neither tuberculosis of the kidney nor any nephritis or other renal lesion is present. It is probable in these cases that some very slight and possibly transitory lesion of the kidney is present. Bacilluria has been found in six cases out of eight where chronic phthisis was present and yet where no gross lesions of the kidney existed. It is most frequently present in acute pulmonary cases, but it may also be found in subacute and chronic cases. Bacilluria is usually accompanied by a slight albuminuria. Jousset concludes by drawing attention to the fact that the tubercle bacillus may be regarded as giving rise, it may be, to (1) a simple bacilluria, accompanied by slight albuminuria, the latter dependent on a slight and transitory nephritis; (2) to nephritis, epithelial or interstitial or mixed, and (3) to definite tuberculosis either in the form of a single caseous mass or else to diffuse miliary tubercle.

Congenital Renal Lesions. Congenital lesions of the kidney are of considerable importance in clinical medicine owing to their diversity and to the serious character of many of them. Many instances of the more severe forms of movable kidney are of congenital origin. Similarly a large proportion of cases of hydronephrosis are dependent on anomalies of the ureter or of the renal vessels, more especially the presence of additional renal arteries. Cystic diseases of the kidney in many, if not in all cases, are of congenital origin.

Further, many tumors are also of congenital origin, and this is a point of great interest and importance in the cases of tumors arising in suprarenal rests. Absence of one kidney occurs with sufficient frequency to materially influence the prognosis and the treatment in cases of calculous suppression. It is probable that complete calculous anuria is more often associated with unilateral obstruction of the ureter in association with congenital absence of want of development of the opposite kidney than with simultaneous bilateral obstruction. The enumeration of these conditions shows what an important part is played in pathology by congenital lesions of the kidney, but in addition to these there are other conditions which may arise as a result of intrauterine conditions or disease. Uric acid infarcts are an instance of the one and congenital syphilitic nephritis an instance of the other.

It is possible that these lesions may lay the foundation of subsequent progressive disease. All the conditions just enumerated are fairly well established and recognized. Castaigne and Rathery[1] made some observations both clinical and experimental which if substantiated would considerably widen our views as to the extent and nature of congenital lesions of the kidney. In a former paper Castaigne was led to the conclusion that the children of certain parents were liable to suffer from what he called a special renal debility of such a character that albuminuria resulted from very trivial causes, and the present work was initiated with the idea of seeing whether this condition was dependent on congenital lesions. The authors record three families where the mother presented renal lesions and where the children were considered by the authors to suffer from this renal debility giving rise to albuminuria.

In the first family the mother suffered from hydronephrosis, movable kidney, followed by interstitial nephritis. The four children of this family were all frail, ill developed, but did not present any signs of true organic disease. They all four, however, had albuminuria as a result of very trivial causes, such as coryza, excess of food, or fatigue from exercise, and apparently albuminuria was invariably present when they suffered from any trivial febrile illness.

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[1] Archiv. de médecin experimentale, January, 1905.

In the second family, where the mother also had a floating kidney and signs of a progressive atrophic nephritis, both children suffered from albuminuria. In one child the albuminuria appeared at the age of five, and at the present time, when he is sixteen years of age, the albuminuria recurs as an accompaniment of any febrile disorder. There were no other signs of nephritis such as œdema or cardiovascular changes. In the second child the albuminuria was of the so-called cyclical type.

In the third family, where the father died from a gouty kidney and the mother suffered from diabetes and albuminuria, three children out of five are known to suffer from albuminuria. In one, aged thirty-two years, interstitial nephritis is present; in the second, aged twenty-seven years, persistent albuminuria without any of the other signs of nephritis is present, and the third, aged twenty-five years, suffered from albuminuria as a sequel to fatigue. The condition of the remaining two children is unknown. In addition to these clinical facts, tending at any rate to show a high incidence of albuminuria in the children of mothers suffering from renal disease, the authors have also been able to make some observations bearing on the morbid anatomy of the kidneys of infants whose mothers succumbed or suffered from advanced renal disease. They have collected 4 cases of infants who only lived from a few minutes to one day and whose mothers suffered from chronic nephritis. The presence of the lesion in the mother was confirmed by postmortem examination in 3 out of the 4 cases. The kidneys of the four infants showed in all cases an overgrowth of connective tissue between the tubules. This overgrowth was especially marked in some zones, and here the vessels were thickened and the glomeruli presented the changes seen in glomerular nephritis. The authors consider that the changes were similar in character to those found in interstitial nephritis of adults.

The duration of life of the infants was so short that the lesions found must have been either of congenital origin or the result of intrauterine disease.

These facts having been observed the authors made a series of experiments to ascertain whether it was possible to produce lesions of the fetal kidney by experimental methods. The authors quote Charrin and Delamare, who state that the crushing of one kidney in pregnant rabbits is followed by the development of zones of congestion and of hemorrhages, together with epithelial changes in the kidneys of the fetus. The authors have used in their experiments an injection of a nephrotoxic serum or else the injection of a renal emulsion, and they state that as a result the fetuses are not only ill developed but that in addition endarteritis, periarteritis, and a slight overgrowth of the connective tissue of the kidney are produced. In addition to these lesions degeneration of the epithelium of the convoluted tubules is also produced. The authors state also that the fetuses of animals that have received injections of toxic renal substances long before also present renal lesions. They consider that the experimental production of renal lesions in the mother is followed by the development of renal lesions in the fetuses, and that the morbid changes found in the kidneys of infants whose mothers had nephritis are similar to those seen as a result of the experimental production of similar lesions in pregnant animals.

Castaigne and Rathery think the fetal lesions of the kidney are produced in the human subject and experimentally as a result of the presence of nephrotoxins in the maternal circulation and their passage through the placenta into the fetus. This view receives some support, as the amniotic fluid of the animals experimented on is nephrotoxic. They conclude by stating that in the human subject a congenital albuminuria or an albuminuria of congenital origin may be seen in the children of parents suffering from nephritis and that sometimes it is probable that renal lesions of a serious character may have this origin.

Movable Kidney. Tuffier,[1] in a clinical lecture on movable kidney, states that according to his experience movable kidney occurs in some 20 per cent. of women. He uses as a test of the presence of movable kidney the fact that the lower border of the organ can be felt on palpation. This perhaps is rather a questionable test, as it would include a very large number of cases where the displacement was very slight and unaccompanied by symptoms. Tuffier considers that movable kidney is not a pathological entity but is part and parcel of some other morbid condition in which it may be either an accessory symptom or else the leading one.

Where movable kidney is really the leading symptom this usually arises from one of two causes, either on account of the pain that is associated with the condition or else owing to some complication such as hydronephrosis. In the great majority of the cases movable kidney is only part of a general enteroptosis, and according to Tuffier this condition is associated with a physiological inefficiency of the tissues. Tuffier divides cases of movable kidney into two groups—the simple and the hydronephrotic. In the one the kidney is simply unduly mobile, and in the other in addition there is hydronephrosis.

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[1] Presse médicale, November, 1904.

The distinction between the two varieties of movable kidney is one that also influences the treatment and prognosis, as, according to Tuffier, the results of fixation where hydronephrosis is present are by no means so good as in the cases of simple uncomplicated movable kidney. The fixation of the kidney may and frequently does relieve the attacks of pain associated with intermittent hydronephrosis, and the gastric and intestinal symptoms so often accompanying movable kidney may also be relieved; but, according to Tuffier, a kidney that has been at all profoundly altered by the distention, a result of the hydronephrosis, never recovers its integrity and such an organ never performs its functions normally.

All authors are agreed that in the great majority of cases of movable kidney marked neurasthenic symptoms of a varying degree of severity are usually present, and even if they are not definitely neurasthenic they at any rate possess a highly sensitive and impressionable nervous system. According to Tuffier, the neurasthenia is primary and precedes the renal mobility. This is a point of considerable importance, as so many authors have looked upon the neurasthenia as the sequel and result of the pain resulting from movable kidney. Tuffier states that the neurasthenia in these patients is accompanied by anæsthesia of the fauces and diminution of the field of vision, both classical symptoms of functional disturbance of the nervous system. In many of these cases if the renal pain be relieved by fixation of the kidney the patients develop some other functional disturbance.

Tuffier analyzes the pain that is associated with renal mobility and considers that several forms may be recognized. The pain may be either permanent and constant or else there may be intermittent exacerbations, or finally it may supervene in crises. The continuous pain is situated in the lumboiliac region and is thus marked off from the sacral pain that is so often the result of pelvic disease. From the lumboiliac region the pain may radiate into the right flank and the iliac fossa or into the inguinal region and down the front of the thigh, and in exceptional cases to the costal margin and even down the corresponding arm. The pain is not usually acute and is more often a discomfort, a sense of weight, or a severe aching. The pain is aggravated by movement, by walking, and even in some instances, according to Tuffier, by mere effort. This may sometimes amount to a functional palsy, and, according to Tuffier, the right arm is much more often involved than the left, and patients may be seen in whom movements of the right arm are absent.

On palpation Tuffier considers that the kidney is not generally painful, or at any rate, is not tender to mere pressure. On the other hand, pain and tenderness are frequently elicited at the moment of reduction of the displaced organ. Pain produced at the moment of reduction is usually local but may radiate down to the groin along the course of the ureter. In many instances the onset of the pain is sudden and subsequent to some traumatism. The traumatism may act directly on the flank or sometimes indirectly, as in the case of a fall or sudden strain. Tuffier considers that there are really two varieties of traumatic cases, one in which the kidney is suddenly displaced as a result of the traumatism, the other and perhaps the more common where the organ has really been displaced for some time without causing symptoms and where the traumatism has in some way led to its becoming painful.

In most cases of movable kidney, however, the onset of the pain is gradual and the pre-existent neurasthenia is greatly aggravated by the development of the renal pain. Tuffier considers that in many patients painful symptoms referable to the intestines, more especially to the cæcum and colon, are also present and mucous colitis is so frequently present as almost to constitute an invariable accompaniment. Tuffier states that in many instances the cæcum, the ascending colon, and sigmoid flexure can be palpated and felt as irregular hard painful cylinders owing to the contraction of their muscular walls. Gastric symptoms are also often present, and most authors have thought that these were in many cases dependent on the displaced kidney dragging down the pylorus and so leading to the production of a dilated stomach. Tuffier does not consider that this is the usual manner in which the gastric symptoms are produced. He thinks they are more dependent on an atonic gastric dilatation than on any pressure or traction exercised on the pylorus by the displaced kidney, although he quite admits that fixation of the kidney will sometimes relieve and cure the gastric symptoms.

In addition to the constant pain patients with movable kidney are liable to paroxysmal attacks. Tuffier thinks two forms of these may be recognized. In the first variety shooting pains radiating from the lumbar region over the side of the chest, and rarely over the sternum, take place. These exacerbations of pain are usually of slight duration and they are not accompanied either by vomiting or distention of the abdomen, but their subsidence is marked by the passage of an abundant clear urine. This, as Tuffier remarks, is really characteristic of the subsidence of all painful states. In the second variety of paroxysmal pain these are associated with the presence of intermittent hydronephrosis. The attacks of pain under these circumstances are quite similar to those seen in renal calculus, except, of course, that no calculus is passed, and, further, that during the development of the pain a renal tumor due to the hydronephrosis is gradually formed. During the onset of the pain the quantity of urine is notably diminished and the disappearance of the pain is often accompanied with the subsidence of the tumor and the passage of an increased quantity of urine.

Tuffier considers that the increased flow of urine is not merely due to the evacuation of the contents of the dilated pelvis of the hydronephrotic kidney, inasmuch as he has seen cases where the distention of the kidney was not sufficient to accommodate more than 20 or 30 gm. of urine, and yet where the subsidence of the attack was marked by the passage of from 500 to 800 gm. (16 to 25 oz.) of urine. In other words, he thinks the increased flow is produced by a reflex effect on the healthy organ.

The attacks of pain due to movable kidney have to be diagnosed from hepatic colic, various forms of dyspepsia, and possibly some forms of intestinal neuralgia. The variations in the size of the kidney afford a most important diagnostic aid, and the only condition producing physical signs at all resembling these is biliary colic with intermittent distention of the gall-bladder. The differential diagnosis between these two conditions has to be made on the physical signs present during the attack.

ANÆSTHETICS, FRACTURES, DISLOCATIONS, AMPUTATIONS, SURGERY OF THE EXTREMITIES, AND ORTHOPEDICS.

By JOSEPH C. BLOODGOOD, M.D.

SURGICAL SHOCK.

From my first contribution to this periodical in December, 1899, up to the present time the literature on this subject has been discussed. From a practical standpoint surgical shock is one of the most important problems in operative surgery. In the investigation of this problem the practical surgeon and the pure scientist—the physiologist—meet on common grounds. Progress in solving many of the questions yet unsettled can only be accomplished by the co-operation of the surgeon and the physiologist.

In the future training of the surgeon the department of surgical physiology must be given more and more attention. This fact was clearly demonstrated at a meeting of the Johns Hopkins Hospital Medical Society on March 20, 1905, when an evening was devoted to physiological problems. The first paper was presented by George W. Crile,[1] of Cleveland, in which he discussed many practical surgical questions, which can only be answered or investigated in the physiological laboratory. The paper was discussed by Dr. Howell, Professor of Physiology, and was followed by contributions to studies in blood pressure by Erlanger and Dawson.[2] On the same evening Dr. Halsted gave a preliminary report of his most interesting experimental work on the partial occlusion of the aorta.

These papers and their discussion impressed me with conclusions which were later emphasized by William Townsend Porter, Professor of Physiology at Harvard, in his most interesting address before the Clinical Society of Surgery, which met in Boston some time in April of this year. The pure physiologist, on the one hand, is not especially interested in practical surgical questions, nor does his usual environment bring him in contact with what we might call the daily vital problems confronting the operating surgeon; on the other hand, the pure scientist works slowly on the solution of a certain problem and is unwilling, as a rule, to make any conclusions until every detail is established beyond a question of doubt. If the problem cannot be solved he drops it and takes up another. Undoubtedly, during these investigations, the physiologist learns many physiological facts which would be of great value to the practical surgeon. Yet, with the rarest exceptions, this valuable information is lost as far as the practical surgeon is concerned. Both Drs. Porter and Howell lamented this result. The average surgeon has little or no training which will fit him to work to any advantage in the physiological laboratory, and, as he gets older, the daily work becomes too overburdening to permit him to engage in scientific investigations in the physiological laboratory. Crile, a practical surgeon, undoubtedly has done more than any one else to bring before his colleagues in surgery information on physiological problems of the greatest value to them in their daily work. It is quite true that the physiologist may criticize that Crile's work lacks perhaps the precision and the absolute accuracy which should characterize all physiological investigations, and that perhaps his conclusions are based on insufficient data. Even granting this to be partially true, Crile's work, which we have previously discussed, has proved to be of great practical value to surgeons. At the November meeting of the Clinical Society of Surgery in Cleveland, in 1904, I am quite convinced that every surgeon who witnessed Crile's demonstration in the physiological laboratory was impressed, first, with the immense import of such experimental work. Every surgeon, especially in the early part of his career, should, in the physiological laboratory with experiments on animals, familiarize himself with these physiological problems; second, every one in the audience, if not already convinced by Crile's publications, became so after his demonstration in regard to the treatment of shock and returned to their own clinics prepared to give up the usual hypodermic stimulation.

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[1] Johns Hopkins Hospital Bulletin, August, 1905, vol. xvi. p. 269.

[2] Ibid., May, 1905, vol. xvi. p. 201.

How, therefore, can we bring the surgeon and the physiologist together? It seems to me that perhaps Cushing's new scheme in teaching to medical students and postgraduates operative surgery may go a long way in filling this gap.

Cushing,[1] in his contribution on comparative surgery, outlines briefly his scheme. The so-called "dog house" which has been erected between the anatomical and physiological buildings will be completed in the fall. This building is so arranged that the courses in operative surgery on animals and all work in physiology and pathology which is done with animal experiments can be carried on under the same roof. The surgeon, physiologist, and pathologist are brought together. Students taking the course in operative surgery can at the same time be instructed in physiological problems. Any operation necessary in the investigation of a physiological or pathological problem can also be used as an instruction in operative technique and wound healing. It is unnecessary to discuss further this very important innovation in medical instruction. The idea that I wish to emphasize to the general profession is the growing importance of physiological knowledge to practical medicine and surgery. In the majority of schools instruction in physiology stops at the end of the second year, and by the time the average student graduates his knowledge in this branch is buried so far beneath the cumbrous mass of clinical facts that he seldom if ever is able to resurrect it for use in his future work. There should be instruction in the third and fourth years designed to keep fresh their physiological information and to apply it to practical clinical problems. Our colleagues in physiology should not bury themselves in the shell of scientific investigation, but should frequently come before the practical physician with the results of their work. No program of a medical society should be considered complete without a contribution on some physiological question of importance to the physician and surgeon. Physiology should be brought as closely to medicine as pathology and anatomy.

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[1] John Hopkins Hospital Bulletin, May, 1905, vol. xvi. p. 179.

Recent Literature on Shock. In the contributions of the last year no great advance has been made in our knowledge of this subject. The papers, however, are more numerous, and there is every indication that the general profession is taking more interest in this question. Unfortunately, I overlooked in the past a very important contribution by Howell[1] on observations upon the causes of shock and the effect upon it of injections of solutions of sodium carbonate. It seems to me that Howell's experimental work confirms Crile's, although he considers that the vasomotor centre in shock is affected more by inhibition than exhaustion. This difference as to the etiology does not change the principles of treatment. Howell summarizes his conclusions as follows:

1. Shock is characterized by a long-continued, low arterial pressure (vascular shock) due to partial or complete loss of activity of the vasoconstrictor centre, and by a rapid feeble heart beat (cardiac shock) due in part, at least, to a partial or complete loss of activity of the cardioinhibitory centre.

2. Cardiac shock may occur more or less independently of vascular shock, but vascular shock is always preceded or accompanied by cardiac

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[1] Contributions to Medical Research dedicated to Victor Clarence Vaughan, Ann Arbor, 1903, p. 51.

shock. The respirations in shock are diminished in amplitude and usually in rate.

3. Shock may be produced experimentally by severe operations of various kinds, but most often by extensive operations on the brain.

4. The physiological evidence in experimental shock indicates that the condition is due fundamentally to a strong inhibition of the medullary centres (vasoconstrictor, cardioinhibitory) leading to a long-continued suspension of activity, partial or complete.

5. Injections of alkaline solutions of sodium carbonate, intravenously or into the rectum during shock, increase markedly the amplitude of the heart beat and bring about a rise of arterial pressure. When the shock is moderate (aortic tension 60 to 70 mm. Hg) the injections may restore arterial pressure to an approximately normal level. When the shock is severe (aortic tension of 20 to 40 mm. Hg) the injections may increase arterial pressure by about 100 per cent. for long intervals, and the effect when it wears off may be restored by repeating the injections. The effect of the injections is due chiefly or entirely to a direct action on the heart.

6. Stimulation of sensory nerve trunks or sensory surfaces in an animal in a condition of shock leads to a further fall of pressure, and to this extent augments the condition of shock.

7. The blood of animals in a condition of shock has no toxic action when injected into the circulation of a normal animal.

The more recent contributions by Crile[1] are in confirmation of his previous communication, which we have discussed.

J. P. Lockhart Mummery[2] has a very extensive contribution on the physiology and treatment of surgical shock and collapse. S. Horsley,[3] of Virginia, contributes an article of similar scope. In the *Index Medicus*, vol. ii., January to December, 1904, I find quite a number of references; one which I especially recommend is by W. T. Porter,[4] of Boston.

We have, therefore, for comparison, the contributions by the physiologists Howell and Porter and the more numerous discussions by men in the practical branch. However, all of these contributions are chiefly confirmatory of our previous knowledge.

There is a piece of experimental work by Schieffer,[5] undertaken at the suggestion of Dr. Bier, Professor of Surgery in Bonn, which is entitled to be placed among the new contributions to the subject of shock.

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[1] American Medicine, 1904, vol. vi. p. 674; Medical News, 1904, vol. lxxxiv. p. 887; American Journal of Obstetrics, New York, 1904, vol. i. pp. 106–110.

[2] Lancet, March 18, 25, and April 1, 1904.

[3] New York and Philadelphia Medical Journal for December 24, 1904.

[4] Proceedings of the American Physiological Society of Boston, 1903–1904, vol. xii.

[5] Deutsche Zeitschrift f. Chirurgie, 1905, Bd. lxxvi. p. 581.

Schieffer is the military surgeon assigned to the Bonn clinic, and he performed many animal experiments in regard to the relation between shock and gunshot wounds. He demonstrated that animals, especially dogs, when shot at from thirty to forty metres with shot, fall and do not rise, that is, the immediate effect of the impaction of the shot is out of proportion to the actual injury. However, when these dogs are completely anæsthetized by Klapp's method of Bier's lumbar anæsthesia the immediate shock is either not present at all or very much reduced. That is, the lumbar anæsthesia apparently blocks the afferent sensory impulses produced by the injurious effects of the shot, and the medullary centres do not receive them. The animals, therefore, show no symptoms until the hemorrhage shows its effect. This experimental study is another confirmation of Crile's method of blocking the nerve trunks in shock, and also demonstrates that anæsthesia is distinctly indicated when manipulations are necessary in the treatment of patients if such manipulations affect the medullary centres.

The Treatment of Shock. Although the following remarks are somewhat of a repetition of what I have said in previous numbers of PROGRESSIVE MEDICINE, nevertheless I am quite convinced that it is not out of place each year to try again to recrystallize our ideas on the proper treatment of this condition. Ignorant as we may be from the standpoint of a pure physiologist in regard to many of the factors which produce shock and of the proper methods of its prevention or treatment, it cannot be denied that physiological investigations and practical experience have taught us much which, if properly employed, will be lifesaving to our patients.

The elements of the injury or the disease which have affected the patient previous to the beginning of treatment must be borne in mind. Their injurious effects already produced we cannot diminish, but we can, from the moment of treatment, prevent to a great extent further injurious effects. We now know that anæsthesia, hemorrhage, unnecessary handling of tissue, and cold are all factors which increase shock. We also know that the usually employed stimulants are contraindicated in shock. Therefore, the first requisite in our treatment of shock is to do nothing which will aggravate the condition. In the past I am quite convinced that many of the methods of the so-called surgical treatment of shock have been harmful. The one drug distinctly indicated is morphine, which should only be given when the patient is restless or suffering from pain. Restlessness and pain undoubtedly give rise to afferent nerve impulses of a depressing effect on the medullary centres. The patient should be handled with the greatest of care, not moved at all, if possible. The elevated position with the head low should always be employed. Artificial heat should be used cautiously and not overdone. In extreme conditions the legs and the abdomen should be bandaged. When shock has been associated with great loss of blood an intravenous saline solution is indicated if the condition is critical; that is, if an effect is desired within a few minutes; in other cases the salt solution can be given subcutaneously. Although in laboratory experiments salt infusions are somewhat disappointing in their effect, they are not harmful, and in practical experience there seems to me to be no question as to their value. Whether the addition of coffee to the usual rectal salt enemata so frequently employed is of value I am not prepared to say. In patients who are somewhat shocked after long operations with general narcosis, we observe that they recover more rapidly and have less postoperative discomforts if the amount of urine eliminated is over 1200 c.c. per diem. The continuation of subcutaneous salt infusions in critical cases and rectal salt enemata in all cases undoubtedly increase the amount of urine. Theoretically this should be associated with a more rapid elimination of the poisonous effects of the anæsthetic and perhaps the blood ferments in the wound. I have been impressed that in the cases in which coffee has been added to the rectal enemata during the first twenty-four or forty-eight hours the amount of urine is greater than when salt alone is used. Coffee undoubtedly is a diuretic; it is also a cardiac stimulant. I can find no experimental work with coffee or its alkaloid, caffeine, along the lines similar to those made with strychnine and digitalis. If the effect of coffee is similar to the other cardiac stimulants it should not be used in shock. Intravenous and subcutaneous salt infusion and salt solution enemata are methods of treatment which are not employed as frequently as they should be. All except the former are easily performed. No physician should be without his infusion apparatus; it is much more important than his hypodermic syringe or his thermometer; yet how few in general practice supply themselves with the infusion apparatus or the rectal tube and glass funnel.

In the recently injured patient it is frequently the misfortune that too much attention is given to the local injury and not enough to the general condition of the patient. There is but one factor in the local injury which demands instant attention—that is hemorrhage. In the majority of recent injuries hemorrhage, as a rule, has ceased when the patient is first seen by the surgeon or physician. In these cases there is no great hurry for operative intervention for the local injury except in cases of hemorrhage. The general condition of the patient should receive first attention, and nothing should be done to aggravate the condition of shock. Only a hypodermic of morphine is indicated. The general public should be instructed not to give injured persons alcohol.

The same criticisms can be made of our treatment of the patient during operation. The younger and inexperienced surgeon allows his attention to be too much concentrated on the operative technique and forgets the general condition of the patient. In the majority of operative clinics and operations the operator gets all the assistance he requires and the anæsthetist is left to shift for himself. In all operations, especially those upon patients in a critical condition, the operator must bear in mind all the factors which increase shock, and attempt by his vigilant and intelligent supervision to prevent their occurrence. As a general rule as little anæsthetic as possible should be given, yet when the operator is forced to handle tissues in such a way that he knows this manipulation is producing bad effects the narcosis should be deeper, because the effect of the narcosis is less injurious than the effect of the manipulations. In certain operations on the abdomen and brain the operator and his anæsthetist should work hand-in-glove together, the depth of the narcosis increasing and diminishing as indicated by the operative manipulation. The surgeon can quickly familiarize himself with the manipulations which increase shock by reading the results of experimental work on animals in the physiological laboratory, which I have previously discussed in this periodical. It is unnecessary now for him to learn this from his own operation. During every operation, and especially if the patient is in a critical condition, no blood should be lost. With our present methods of hæmostasis, hemorrhage should be considered, with the rarest exceptions, within the absolute control of the surgeon. During the operation the elevated position, head low, should always be employed if there are any symptoms of shock, and the patient should be kept warm. Intravenous and subcutaneous infusions can always be given if indicated. It is my opinion, however, that with rare exceptions these should be postponed until the end or after the operation. Hypodermics of any cardiac stimulants are contraindicated. I have not had sufficient experience with the use of adrenalin in the salt infusion, nor is there in the literature of the last year anything to indicate that its practical value is equal to that demonstrable in experimental work. This may be due to the fact that surgeons have not used it enough. In my own experience I have not yet found the necessity for any additional drug in my treatment of shock. The methods just discussed have been so satisfactory that I have hesitated to use adrenalin, fearing the injurious effects of an overdose. There are cases, however, now and then, for which adrenalin in the salt solution is indicated, provided it will accomplish on the human subject that which it has done on the animal. In a desperate case I should not hesitate to employ it as recommended by Crile.[1]

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[1] Progressive Medicine, December, 1903, p. 87.

With the practical use of Crile's[1] pneumatic suit I have had no experience. However, I was very much impressed with Crile's demonstration before the Clinical Society of Surgery in Cleveland, November, 1904 At that time he removed a large goitre under ether narcosis. The patient was encased in his pneumatic suit and was in an elevated position, head high. It seemed that this suit allowed an absolute control over the blood pressure and a position of the patient most convenient for the surgeon, but which would be dangerous for the patient without the pneumatic suit. When one can find no fault and has had no bad experience with one's own methods it is difficult to force one's self to try other methods, but I am inclined to think that this pneumatic suit will find a distinct place in operative surgery.

Blood Pressure. In PROGRESSIVE MEDICINE for December, 1904, I had nothing further to say on this subject which was introduced in 1903. Since then I have read the report of the Committee of Research of the Division of Surgery of the Harvard Medical School, by Faulkner, Stone, and Murphy,[2] which is also editorially considered.[3] The most extensive studies on blood pressure have been published by Erlanger and Hooker.[4] Cabot[5] presents an interesting study of blood-pressure measurements before, during, and after the administration of strychnine and alcohol in a number of febrile diseases.

The Committee of Research from the Harvard Medical School concluded that the number of factors which may influence the curve is so great that too much reliance should not be placed upon the blood-pressure records. Cabot was unable to demonstrate that strychnine and alcohol had any influence on the blood pressure in the febrile conditions which he investigated.

The majority of recent literature on blood pressure will be found in American medical periodicals. Wainwright,[6] of Scranton, in a most interesting series of clinical studies on blood pressure and shock in traumatic surgery, seems to me to confirm the experimental work of Crile. He relies chiefly on morphine and the mechanical treatment of shock. He places little reliance on stimulants, advises intravenous and subcutaneous infusion, and questions the value of adrenalin. This communication is one of the best that I have read, and will be of value to surgeons because it is written by a colleague who has had unusual experience in traumatic surgery.

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[1] PROGRESSIVE MEDICINE, December, 1903, p. 87.

[2] Boston Medical and Surgical Journal, March 10, 1904.

[3] Medical News for April 9, 1904, p. 703.

[4] Bulletin of the Johns Hopkins Hospital, May, 1904, p. 179, and the Johns Hopkins Hospital Reports, vol. x.

[5] American Medicine, July 2, 1904, p. 31.

[6] Medical News, March 25, 1905.

One interested in the technique of taking blood-pressure records in clinical cases should read the article by Cook and Briggs.[1] This should be read in connection with Erlanger's[2] communication.

Solmann and Brown[3] have investigated the effect of intravenous injection of ergot on the blood pressure, and conclude that there is no evidence to recommend its use in shock.

At the present time my own experience is not sufficient to estimate the practical value of blood-pressure records in surgical cases and during operations. I am impressed, however, that it is a very important field for further investigation.

ANÆSTHESIA.

This subject was discussed in December, 1900. During the past year the chief contributions are those on spinal anæsthesia. Bier, the originator of this method, who from the beginning cautioned against its indiscriminate use, now publishes his modification, which he considers a sufficient improvement over the old method to justify the statement that spinal anæsthesia deserves a distinct place in our methods of narcosis. The contributions from his German colleagues confirm Bier's statements, and for this reason I feel that perhaps this method has passed the stage of experimentation.

On local infiltration anæsthesia nothing new has appeared. The method is increasing in its application, due to the growing familiarity with the details of the technique. In general narcosis there is apparently a continuous change toward methods of what we previously discussed as mixed narcoses. But apparently ether is still the anæsthetic of choice.

Spinal Anæsthesia. Bier's[4] paper and its discussion before the last German Surgical Congress in April, 1905, is a most important contribution. Bier reminds us that it is four years since his first report, and now for the first time he feels confident in stating that his method is past the experimental stage. The improvement consists in the substitution of stovain, a preparation by a French chemist, for cocaine, the addition of adrenalin or like preparations, such as suprarenin, paranephrin, and certain perfections in the technique. The details of the technique were reported by Dönitz, one of Bier's assistants, but this report is not reviewed in the *Centralblatt f. Chirurgie*, and the original, if published, I cannot find. The last report of Bier's technique appeared in the *Münchener med. Wochenschrift*, 1904, No. 14. For this reason

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[1] Johns Hopkins Hospital Reports, vol. xi., Nos. 1 and 9.

[2] Loc. cit.

[3] Journal of the American Medical Association, July 22, 1905, vol. xlv. p. 229.

[4] Centralblatt f. Chirurgie, 1905, vol. xxxii., supplement, p. 7; Archiv f. klin. Chir., 1905, vol. lxxvii. p. 198.

I shall leave the detailed discussion as to the technique until next year, when the latest methods can be presented from Dönitz's publication. Bier advises that the adrenalin solution (the commercial 1:1000), 0.5 c.c., should be added to the solution of stovain and both injected together. The withdrawal of the spinal fluid and its mixture with the anæsthetic solution follow the same lines previously discussed with cocaine. This change of drugs has demonstrated that the patients show practically no toxic effects during the anæsthesia and suffer less from postanæsthetic discomforts. The percentage of failures has been very much reduced. There are no deaths which could be attributed to this method of narcosis; it is especially applicable to old and feeble people, subjects whom Bier considers bad for general narcosis. Bier reports over 300 cases with 4 per cent. of failures. Some ten German surgeons entered into the discussion; the largest number of cases reported from a single clinic was 480. Some of these authorities have had equally good results with tropacocaine and eucaine. Sonnenburg's experience is chiefly with stovain, similar to Bier. Sonnenburg was the first to report on the use of stovain. The majority of these surgeons advocate the combination with some adrenal preparation. Peonaru-Caplescu, from the Bucharest clinic of Joannescu,[1] reports 46 cases of spinal anæsthesia with stovain. The amounts used varied from 0.03 to 0.07 cg.; there is no mention in the review of the addition of adrenalin; the results seem to be as satisfactory as Bier's report. Füster[2] reports on 235 cases from v. Hacker's clinic in Graz. He uses tropacocaine without adrenalin. As far as I can make out his results are as good as Bier's; he mentions 4.7 per cent. failures. His technique is as follows: "The preparation of the patient proceeds in the same way as for any other operative intervention, thorough disinfection of the field of operation after the patient has been placed on his left side, trunk elevated, head lowered forward, lower extremities drawn to abdomen, giving the greatest possible anterior curve of the spine and separation of the vertebral arches in order to facilitate entrance to the dural sac and produce increased pressure within it. Now, from the side of the patient nearest the table (to facilitate the reflux of cerebrospinal liquor) the spinous processes of the second and third lumbar vertebræ are located. This is comparatively easy when one bears in mind that a horizontal line between the two cristæ ilei strikes the apex of the spine of the fourth lumbar vertebra; the distance between the two spinous processes is divided into three parts, and, after the place of puncture has been infiltrated with Schleich's solution, the needle is pushed in at the junction of the upper and middle third of the line about the width of a thumb from the median line at an angle of

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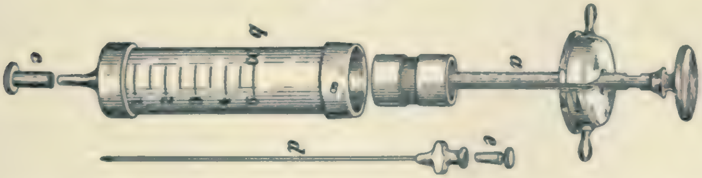
[1] Revista de Chir., 1905, No. 1; Review in Centrbl. f. Chir., 1905, vol. xxxii. p. 528.

[2] Beiträge zur klin. Chir., 1905, vol. xlvi. p. 1.

60° downward, and toward the median line, which should be reached at a depth of from 5 to 6 cm. The needle is thrust forward under uniform pressure, and its entrance into the dural sac is evidenced to the finger distinctly by the fact that after overcoming the firm rigid fascia it enters more easily; besides, this movement is frequently felt by the patient as a distinct pain. Now, the mandarin (trocar) is withdrawn and the liquor which escapes, sometimes gradually drop by drop, sometimes in a continuous stream, is caught in a small glass with concave bottom containing the ready dose of 0.07 gr. tropacocaine; the quantity of the cerebrospinal fluid which should be permitted to flow into this glass is about 7 c.c.; that is, a cubic centimetre of fluid to each centigram of tropacocaine. Now, the trocar is again inserted to stop the flow of cerebrospinal fluid, with a second needle held ready for use when the mixture is stirred to aid the solution of the tropacocaine; the contents of the glass is sucked up into a Pravaz syringe holding about 10 c.c., and after the trocar has been removed and the air expelled from the Pravaz the injection is given under a slow but steady pressure. This accomplished, the needle is pulled out with a rapid motion and the place of puncture protected by an iodoform-plaster dressing. The patient is then placed in the position requisite for operation—we have never employed elevation of the pelvis—and after waiting a few minutes the last disinfection of the field of operation is begun." This contribution by Füster is monographic in character.

FIG. 6



A second contribution of similar scope has been written by Kurzwelly from Braun's[1] clinic in Leipzig. We owe to Braun the explanation of the use of adrenalin in local anæsthesia and also the amplification of the intraneural method of local anæsthesia, both of which I have previously discussed. In this clinic cocaine is used with adrenalin. Kurzwelly claims, perhaps, better results than Bier with cocaine and adrenalin, so far as after-effects are concerned. Of course, he has not been able to compare them with the results of stovain as yet. The technique of the lumbar puncture and intraneural injection is about the same as that just described by Füster, except it is somewhat simpler and impresses me as better. Fig. 6 illustrates the needle and syringe used. The needle *d* plugged with a stopper *e* is introduced as previously described. Into the syringe *b* stopped by cap *c* the required amount of sterilized cocaine suprarenin tablets has previously been placed. The dose of each tablet is 0.01 cocaine and 0.0001 of suprarenin. One to two tablets are employed. These tablets are sterilized in Petri dishes, they are picked up with sterilized forceps and placed in the syringe *b*. After the needle *d* has entered the dural sac the stopper *e* is removed and cerebrospinal fluid is allowed to flow into syringe *b;* if one tablet is to be used about 2.5 c.c. of fluid is collected; if two tablets, 5 c.c. is used. After the required amount is collected stopper *e* is replaced in the needle; the piston *a* is introduced into syringe *b*, which is now turned upside down, the cap *c* taken off, and the piston *a* pushed up until all air is expelled, shaken a little until the tablets are dissolved, then the plug *e* is again removed from the needle and replaced by the syringe, and the anæsthetic solution introduced.

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[1] Deutsche Zeitschr. f. Chir., 1905, vol. lxxviii. p. 142.

I am sorry not to be able to present Bier's latest technique for comparison, but the principles, as far as I can gather from this extensive reading, are about the same. No cerebrospinal fluid is lost; it is used to dissolve the anæsthetic and the vasoconstrictor adrenalin. It is rather interesting that the three chief contributors use a different anæsthetic—Bier stovain, Füster tropacocaine, and Kurzwelly cocaine—and apparently get equally good results. In the discussion of Bier's article there was an equal diversity of anæsthetics, the majority favoring stovain or tropacocaine with admixture of adrenalin. From this it is fair to conclude that the improved results of spinal anæsthesia are not so much due to the substitution of another drug for cocaine, but to improvement in the details of technique.

The next most interesting contribution on this subject is by Rudolf Klapp.[1] He experimented first with the addition of adrenalin to cocaine in local anæsthesia, and his experiments confirmed the previous work of Braun,[2] which I have previously discussed. It is well known that if sugar milk is injected subcutaneously it is very quickly taken up by the circulation and excreted in the urine. If adrenalin from drops 1 to 20 is added to the milk-sugar the rate of elimination is diminished in pretty direct proportion to the amount of adrenalin. Braun had demonstrated that he could give animals subcutaneously lethal doses of cocaine provided it was mixed with adrenalin. The effect of the adrenalin locally is the same as cold, or the application of an Esmarch bandage or anything that produces a local anæmia. In his second communication Klapp[3] gives us an excellent experimental study on lumbar anæsthesia, especially in regard to the effect of the addition of adrenalin. If milk-sugar is introduced intradurally it is excreted in the urine. The excretion, however, is much more rapid than when introduced subcutaneously. After a subcutaneous milk-sugar injection the sugar appears in the urine in varying amounts distributed over a few hours; when injected intradurally it is excreted in the urine usually within the first hour; that is, Klapp has confirmed what has previously been known—that absorption of drugs or toxins from the intradural fluid is much more rapid than from subcutaneous tissues. He demonstrated that when adrenalin was added to the milk-sugar the elimination of the sugar after the intradural injection was very much decreased, but the effect was by no means as rapid as in the subcutaneous experiment. That is, we cannot expect the adrenalin to have an equally inhibitory effect when added to cocaine in the intradural injection as in the subcutaneous. Nevertheless it had sufficient effect to exhibit a decided difference in the intensity of the toxic effects of the cocaine. Klapp, however, was able to absolutely prevent the toxic effects of cocaine in animals if he added gelatin to the cocaine and adrenalin. He reasons that the coagulable gelatin prevented the dissemination of the toxic cocaine in the cerebrospinal fluid and thus protected the higher centres from its toxic action. Unfortunately gelatin is not yet applicable for intradural injections in man. The necessary perfect sterilization impairs its coagulability, which is the chief factor of its value. Those interested in experiments on animals should read this contribution of Klapp. I am inclined to feel that it is the best method of anæsthesia for dogs, not only on account of its simplicity, but it is less dangerous than general narcosis. This method of Klapp may prove of great value to veterinary surgery.

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[1] Deutsche Zeitschr. f. Chir., 1904, vol. lxxi. p. 187.

[2] Archiv f. klin. Chir., vol. lxix. p. 541.

[3] Ibid., 1904, vol. lxxv. p. 151.

General Anæsthesia. Accumulated experience and reading of the literature on this subject impress me more and more that anæsthesia is an art in every sense of the word. Specially trained anæsthetists are necessary for safety. Ebbinghaus[1] in reviewing Levi's article[2] calls attention to the fact that his observations during visits to English clinics have impressed him that anæsthesia is administered better there than in German clinics. He attributes this to the fact that in England anæsthesia is becoming a special branch of medicine, and the majority of operations in hospitals and in private practice are performed under narcosis administered by an expert; also teaching in medical schools on this subject is better and more systematic than in Germany. Ebbinghaus states that the majority of these expert anæsthetists use some form of an apparatus, as a rule, of their own device or a modification of some other apparatus. The principle, however, of all these apparatuses is that the single or mixed anæsthetic is administered in exact doses, and the apparatus is simple and easily portable.

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[1] Centralbl. f. Chir., 1905, vol. xxxii. p. 730.

[2] Lancet, May 27, 1905.

The excellent review[1] of Dumont's text-book on *General and Local Anæsthesia for Physicians and Students*,[2] expresses pretty clearly the consensus of our views on this subject up to the present time. A general narcotic must always be considered a toxic substance which produces a partial intoxication; that the training of students in its use is defective in the majority of medical schools. No one anæsthetic can be considered equal to all occasions. The anæsthesia must be selected for each individual case; if possible it should be administered by an expert. Ether produces a rise in the blood pressure and is contraindicated in acute lung lesions and patients with hyperarterial tension. Chloroform produces a fall in the blood pressure; it should never be given in cases of shock or in patients suffering from cardiac lesions. Ethyl chloride and bromchloride are excellent agents for a very short anæsthesia; bromethyl is preferred. This view is held by my colleague, Dr. Warfield, and his results have been excellent with this anæsthetic for short operations on the nose and throat. These anæsthetics should never be given for long narcoses. It is especially important that they should be chemically pure and used the moment the flask is opened; if any of the anæsthetic remains it should be thrown away, as it rapidly undergoes chemical changes when exposed to the air. Nitrous oxide gas is the safest of all anæsthetics; it is valuable in the introduction of narcosis, to be followed by ether or chloroform. In the hands of experts the so-called mixed narcosis is apparently generally preferred; the mixtures are nitrous oxide, oxygen, ether, and chloroform in various combinations.

As this review is written chiefly for the general practitioner, not the expert, I feel justified in recommending that in the majority of cases it is better to narcotize the patient with ether or chloroform, using with chloroform the drop method on the usual open-face mask, and the same method with ether with the open cone. I should recommend to the younger men giving anæsthesia in large clinics that they make a special study of mixed narcosis and the various apparatuses in use by experts.

Wohlgemuth,[3] who is known as the originator of the oxygen-chloroform narcosis, emphasizes the importance of a most careful preliminary examination of the patient before the operation by the anæsthetist. This, I am quite sure, is frequently overlooked. In the majority of cases in large clinics the anæsthetist knows very little about the patient. This one point in Wohlgemuth's communication is one that should be

[1] Centralbl. f. Chir., 1905, vol. xxxii. p. 243.

[2] Wein, Urban, and Schwarzenberg, 1903, 234 pages, 116 illustrations.

[3] Med. Klinik, 1905, No. 20; review in Centralbl. f. Chir., 1905, vol. xxxii. p. 718.

taken very seriously. This careful preliminary study, which would include heart compensation, blood pressure, blood count, the condition of the organs, a knowledge of the habits of the patient, the disease to be treated, is a very important one, especially in critical cases. Very stout alcoholic men take ether badly, yet some of them have lesions that contraindicate pure chloroform. This class of cases is the most difficult to narcotize. Wohlgemuth also calls attention to an important detail in anæsthesia which I have just discussed under shock; that the anæsthetist must be prepared and trained to keep the patient under partial or deep narcosis, as indicated by the nature of the operative manipulations.

ETHER NARCOSIS. Alice Magaw,[1] in her report on 11,000 general narcoses without a death, recommends the ether-drop method on the open mask. Those of us who favor ether are always pleased with contributions of this character. Yet it is quite possible that one who gives ether so well might have equally good results with other anæsthetics properly selected to fit the individual case. The German reviewer[2] was especially impressed with her remarks on the mental treatment of the patient during the beginning of the narcosis, that everything should be done with tact and gentleness to inspire their confidence, and every arrangement should be made to ensure absolute quiet and freedom from any external disturbance. These suggestions of this anæsthetist are unusually important, especially in children and nervous adults.

Eurén, of Sweden,[3] similar to Magaw, reports most satisfactory experience with the ether-drop narcosis on a small, open chloroform mask. In some cases morphine is given half an hour before the narcotic. If the patient is alcoholic a few drops of chloroform are given with the ether drops, and Eurén claims that in this way he shortens or prevents the stage of excitation and the muscle spasm and cyanosis so frequently observed in ether in this class of patients. Eurén also calls attention to the fact that this method of giving ether is the safest in inexperienced hands, and that it is the proper way to produce an ether intoxication when in local infiltration anæsthesia we desire a slight general narcosis. This drop method is the one I personally prefer. In individuals, especially in men, in whom we expect some trouble because of a history of alcoholism, or a thick neck, morphine should be given before. At any time during the ether-drop narcosis it is very simple to change to a few drops of chloroform if this be indicated. In the beginning of narcosis a few drops of chloroform can be given if the patient shows excitement, or an indication that the drops of ether are not sufficient to push the narcosis to the second stage. At any time during the narcosis rigidity of the muscles or increased mucus can, as a rule, be immediately relieved by a change to chloroform for a few drops. I am just beginning to learn and to teach my anæsthetists this method of anæsthesia, with most excellent results.

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[1] New York and Philadelphia Medical Journal, November 12, 1904.

[2] Centralbl. f. Chir., 1905, vol. xxxii. p. 207.

[3] Hygiea, vol. lxvi. ser. ii., J. iv. p. 1018; review in Centralbl. f. Chir., 1905, vol. xxxii. p. 63.

Teuner,[1] from Bohemia, advocates ether in all cases. He reports during five years 1020 narcoses. His method is similar to that of Eurén and Magaw. No fatalities were observed. There were 6 cases of pneumonia, 2 of asphyxia, and 1 of mania, and a few cases of unimportant bronchitis. What Teuner means by asphyxia must be a very critical one, or he is an expert anæsthetist. Asphyxia is the most common accident during ether narcosis, and with the ordinary anæsthetist much more frequent than 2 out of a 1000 cases. It is just this accident that brings odium on ether narcosis. The manipulations necessary for the resuscitation of the patient may occur during the most critical part of the operation. I have never seen a death due to this accident, but it is always distressing. It occurs most frequently in the hands of inexperienced anæsthetists. If the drop method which we have discussed is employed and a little chloroform given now and then when indicated this accident rarely if ever happens. Teuner's observations on the leukocytes after ether narcosis are interesting 72 per cent. showed a rise, 8 per cent. a fall, 20 per cent. no change.

Pletzer[2] is also an advocate of ether and the drop method of narcosis. He describes his extensive experience and demonstrates the importance of small details for successful narcosis. He advocates the preoperative disinfection of the mouth and pharynx, that the head should be low during anæsthesia, and that after operation the patient should be encouraged to make deep respirations. He seems to think that the latter prevent postoperative lung complications.

CHLOROFORM ANÆSTHESIA. I always approach the subject of this form of anæsthesia with the fear that I am a prejudiced reviewer. In my experience ether is the anæsthetic of choice, but I find that each year, in selected cases, I am using chloroform more frequently alone or in combination with ether. In cases of intestinal obstruction or peritonitis I fear ether. It is so difficult to anæsthetize these patients with ether without running the great risk of vomiting, which is a dangerous accident. If the stomach can be washed out thoroughly before the operation ether can be given. These patients, as a rule, are so ill that one hesitates to add to their distress by washing out the stomach, so that it has been my rule to place them on the table and prepare the skin of the abdomen for operation. This, of course, shortens the anæsthesia.

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[1] Centralbl. f. Chir., 1905, vol. xxxii. p. 612.

[2] Med. Klinik, 1905, No. 20; Centralbl. f. Chir., 1905, vol. xxxii. p. 719.

They are then narcotized with the chloroform drop method, the stomach washed out, and the operation proceeded with under ether narcosis. If the patients do not take the ether well chloroform is substituted, and in some cases we change quite frequently from chloroform to ether and the reverse. So far this method has been very satisfactory. One feels that one is using very little chloroform, and at the same time the ether narcosis is devoid of those distressing accidents of asphyxia and vomiting.

However, when chloroform is employed, one is always, no matter how large his experience, in fear of a sudden cardiac collapse. Keen[1] reports two cases of chloroform collapse in which energetic massage of the heart was employed, with one recovery. I have fortunately never observed this collapse. During the last year I have had two experiences with ether which for the moment seemed critical. One was a thin, delicate man, aged sixty-five years, suffering with carcinoma of the bladder, the other a thin, weak man, aged forty years, with carcinoma of the rectum. A careful preliminary examination of both showed no evidence of other disease; one was only impressed with their lack of muscle development and tone. In both the anæsthetist was rather inexperienced, and I am inclined to feel that inadvertently he gave entirely too much ether to produce narcosis. I saw the patients as they were lifted on the operating table preparatory to the operation. The very shallow respiration and the relaxation of the jaw impressed me that they were too deeply narcotized. As I suggested to the anæsthetist to discontinue the anæsthetic the patient ceased breathing; the pulse, however, in both cases, although weak, was not rapid; there was no cyanosis, no obstruction to breathing, every muscle was absolutely relaxed; the pupils were a little dilated, and there was no conjunctival reflex. Nothing was done except artificial respiration, gentle massage to the heart, and inhalation of aromatic spirits of ammonia. Just how long it was before respiration began again I do not know—it seemed hours. In one of the patients I delayed the operation for three days; the anæsthetic was given by an expert, and there were no complications; the patient recovered. In the second patient, the younger, with carcinoma of the rectum, the operation was continued; it was the combined abdominal and sacral method, and required four hours; but during this time the patient was never again allowed to be completely narcotized. The anæsthetist must remember that the dose of anæsthetic necessary to narcotize is in a pretty fair proportion to the body weight, and he must give the young children and the thin, emaciated adults very much less anæsthetic. I believe these two cases were distinct illustrations of an overdose of ether with its effect on the respiratory centre; neither had been given morphine. The second patient also had no complications and made a complete recovery.

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[1] Therapeutic Gazette, April 15, 1904.

Chloroform Apparatus. One interested in this subject will find a full discussion with illustrations[1] which took place before the Paris Academy of Medicine. As I have had no experience, except with the drop method, I am not in the position to discuss these apparatuses and new methods in an intelligent way. It seems to me that with the drop method one can narcotize with as little chloroform as possible, and this is the chief factor in safety. On the other hand, the anæsthetist has so much to do that he should not be burdened with complicated machinery. If, however, these apparatuses simplify anæsthesia and make an overdose of the anæsthetic impossible, their value cannot be questioned.

THE EFFECT OF ANÆSTHESIA ON THE INTERNAL ORGANS. One, even at this time, always welcomes new investigations on this subject. We must bear in mind that when the patient awakes from the narcosis the dangers of its effects are by no means over. In our scheme of ideal anæsthesia we not only endeavor to ensure against death under narcosis, but against injurious after-effects. Three extensive contributions have recently appeared, one by Offergeld[2] and two by Müller.[3] The experimental work of these two men agrees. Offergeld worked chiefly with chloroform, Müller with all anæsthetics. Both agree that any anæsthetic produces definite changes in the cells of all the internal organs. This change is chiefly a fatty degeneration, which, as a rule, regenerates. Repeated narcosis, especially within six days, is especially injurious; that is, a second narcosis before regeneration is complete from the first narcosis and is much more dangerous than two narcoses with a longer interval. Because of this finding they criticize the usual gynecological method of an examination under anæsthesia, to be followed in a day or two by the operation. The changes after chloroform are more marked than after ether, especially in the liver and kidney, but the changes in the lungs after ether are more marked than after chloroform. These pneumonic changes are definite focal areas of inflammation. Mixtures of ether with chloroform do not diminish the effect of chloroform on the kidney, nor does the dilution of ether with chloroform diminish the effect of ether on the lungs. Previously diseased organs show the pathological changes more intensely and regeneration is less complete. Admixture of oxygen to the anæsthetic apparently diminishes the injurious effects to some extent. There, however, is no known drug which will entirely prevent the toxic effect of any anæsthetic. The injurious effects of bromethyl are so marked that it should never be used for a long narcosis. This work is confirmatory of previous experimental work on animals and autopsies in cases which have died after anæsthesia. It simply emphasizes the statement so often made, that anæsthetics—all of them—are toxins and must be used with the greatest caution.

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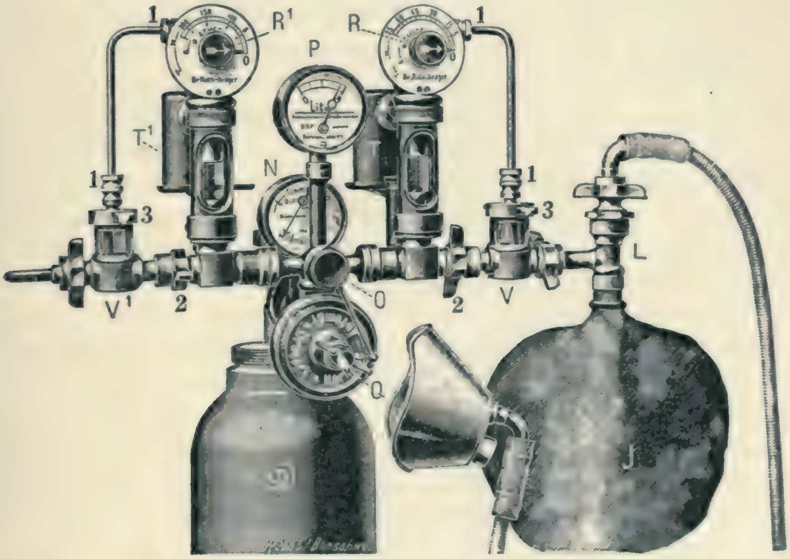
[1] Centralbl. f. Chir., 1905, vol. xxxii. p. 528.

[2] Archiv f. klin. Chir., 1905, vol. lxxv. p. 758; Centralbl. f. Chir., 1905, xxxii. p. 346.

[3] Archiv f. klin. Chir., 1905, vol. lxxv. p. 896; Ibid., 1905, vol. lxxvii. p. 420.

Mixed Narcosis. The mixtures are too numerous to mention. We have previously discussed this question and stated that the accumulated experience seems to favor this method. In Müller's[1] second contribution he has studied the question clinically with extensive blood-pressure measurements and experimentally on animals, and concludes that oxygen is a very important, perhaps essential, gas to combine with every anæsthetic. The oxygen-chloroform narcosis is better than the simple chloroform; in both the blood pressure is lower, but in the oxygen-chloroform the depression is less and the fluctuations not so marked.

Fig. 7



The oxygen-ether narcosis is better than the simple ether, and better than the oxygen-chloroform. In all ether narcoses the blood pressure is, as a rule, above normal, while in all chloroform narcoses it is below normal. But Müller concludes from his investigations that a mixed oxygen-chloroform-ether narcosis, or in certain cases a mixed oxygen-ether-chloroform narcosis, is the best; that is, in those cases in which experience has demonstrated that chloroform is the anæsthetic indicated we should combine the chloroform with oxygen all the time and add ether from time to time, as indicated by the blood pressure. In those cases in which ether is the anæsthetic indicated oxygen is combined with the ether, and chloroform is given at intervals in five-drop doses.

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[1] Loc. cit

An apparatus by which this method, advocated by Müller, can be executed with ease and exactness is shown in Fig. 7, and is described in detail in the article by Kionka and Krönig, of Jena. From the illustration one can see how easily the ether or chloroform gas in exact doses can be added to the oxygen gas. The method, however, can be performed with a simple oxygen apparatus.

CONCLUSIONS. It is to be remembered, however, that even with these apparently perfect apparatuses which regulate the dose of the anæsthetic and which combine it with oxygen we are still dealing with toxic substances, and there are still dangers during the operation and possibilities of postanæsthetic fatalities or complications. Deaths have been reported with almost any anæsthetic and every apparatus. It appears to be an almost impossible task to accumulate the figures and sift the facts which will allow positive and correct conclusions as to which is the safest method. The general principles remain the same. When anæsthesia is given with great care and every detail is watched with the utmost vigilance the dangers decrease, and I am impressed that this is the first requisite of every form of anæsthesia. This fact must be impressed upon the one who is to give the anæsthetic. At the same time the surgeon should consider that anæsthesia is an integral part of the operation, the supervision of which belongs to him and for which he must be responsible. The trained anæsthetist undoubtedly will relieve him of many of the anxieties, but should not relieve him of the responsibility. For this reason the general surgeon must keep abreast with improvements in anæsthesia.

Local Anæsthesia. This subject was introduced and fully considered in PROGRESSIVE MEDICINE for December, 1901, when I considered in detail the infiltration, the paraneural, and intraneural methods. In the following three years nothing has been added to the principles of these methods except the introduction of adrenalin, which on account of its vasoconstrictor action localized the effect of cocaine and decreased its toxic effects. In 1903 I neglected to refer to Braun's[1] extensive communication. This communication by Braun, who, perhaps next to Schleich, has written more on this subject than anyone else, is simply an amplification on his previous work on the intraneural method. Surgeons wishing to enlarge the field of local anæsthesia will find his diagrams and plates of the greatest value in indicating to them the nerve or nerves which should be injected to render anæsthetic certain areas. During the present year the only additions to local infiltration are contributions on the use of adrenalin, which are only confirmatory of what I have previously stated. In addition, stovain, which Bier[1] recommends as a substitute for cocaine, has been used naturally in local anæsthesia.

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[1] Archiv f. klin. Chir., 1903, vol. lxxi. p. 179.

My personal experience with cocaine in solutions of 1:1000 or 1:3000 is so satisfactory that it seems to me that there is no room for improvement. Experience has demonstrated that if one understands the principles of infiltration—paraneural and intraneural injection—one can get such good results with such weak solutions of cocaine that large amounts can be used without any danger of its general toxic effect. It is remarkable how much can be done with local anæsthesia. During the last few years I have been able, even in young children, to resect ribs and drain an empyema with practically nothing but local anæsthesia. Now and then a few drops of chloroform have been given. In this operation it is important to infiltrate well about the intercostal nerve in the groove on the lower side of the rib. In very ill patients suffering with empyema of the gall-bladder cholecystotomy can easily be performed under this method of narcosis if the gall-bladder is enlarged. Other operations, too numerous to mention, are possible. In critically ill patients in whom long general narcosis is contraindicated, one should do as much of the operation as is possible under local anæsthesia. In patients suffering from shock one must recollect that certain manipulations which increase the shock should be performed under general narcosis, unless these nerve impulses can be blocked by intraneural injection possible in amputations.

ANÆSTHESIN. Lotheissen[2] recommends this anæsthetic powder for local anæsthetic use. Combined with lanolin and vaselin (anæsthesin 10 parts, lanolin 50 parts, vaselin 50 parts) it can be used as an anæsthetic lubricant on instruments introduced into the rectum and œsophagus, or an anæsthetic ointment in the treatment of painful ulcers and fissure in ano. I have had no experience with it.

SCOPOLAMINE-MORPHINE NARCOSIS. This method of producing a general narcosis by the hypodermic administration of the drugs, originated by Schneiderlin in 1900, was discussed in PROGRESSIVE MEDICINE for December, 1903, as a method still in its experimental stage. In 1904 the year's experience had added nothing worthy of comment. Up to this time this method of narcosis had been given attention in this country only in editorials and reviews. During the last year the first two papers have appeared on the experience with this method of anæsthesia in this country. Emil Ries,[1] of Chicago, reports on his personal experience of 72 cases, and Major Gabriel Seelig[2] on a series of 65 cases. Seelig used the scopolamine-morphine in conjunction with general anæsthesia. In these two articles one will find almost a complete bibliography.

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[1] See articles by Coakley, Medical News, April 15, 1905; Cerneszi, Centralbl. f. Chir., 1905, vol. xxxii. p. 284; and Peonaru–Caplescu, Centralbl. f. Chir., 1905, xxxii, p. 528.

[2] Wiener klin. Rundschau, 1904, No. 44; Centralbl. f. Chir., 1905, vol. xxxii. p. 719.

Seelig gave each patient about one-half an hour before the general anæsthetic a hypodermic of scopolamine hydrobromate, grain 1:100 and morphine grain 1:6. The general anæsthetic used later was ethyl-chloride-ether sequence administered through the Bennett inhaler. In passing it is interesting to note that Seelig substitutes ethyl chloride for nitrous oxide because it is practically as safe, induces quicker anæsthesia, causes no cyanosis or asphyctic symptoms, and obviates the necessity of transporting bulky apparatus. I think this substitution can be criticized. My discussion of the experimental work in this number demonstrates that ethyl chloride has distinct injurious effects greater than ether on the internal organs. Why, therefore, should it be substituted for nitrous oxide which we know to be absolutely harmless? Again, why substitute ethyl chloride for ether in the beginning of narcosis, which is distinctly more dangerous, simply to save a little time? Seelig's communication, however, is one of great interest, and apparently he has had good results with the ethyl-chloride-ether sequence given with the Bennett inhaler, which required certain modifications to permit the use of ethyl chloride. Seelig claims that the preliminary scopolamine-morphine injection reduces the amount of the general anæsthetic and that the entire picture of the general narcosis is more satisfactory from beginning to end.

The dose used by Seelig, both of morphine and scopolamine, is without danger, and it seems to me that this experience in addition to that already published should induce us to try the method.

Ries has used the scopolamine-morphine for the complete narcosis, and claims that, although a number of deaths have been reported, only one can really be attributed to this narcosis, the case reported by Flatau.[3] Ries collects from the literature 554 cases; he objects to the large dose of morphine recommended by Blos and follows the dosage recommended later by Korff,[4] who gives $\frac{1}{10}$ mg. scopolamine and 25 mg. morphine, divided in three doses.

Dirk,[5] in a meeting of the Surgical Society of Berlin, December 12, 1904, reports favorably on his experience of 260 operations under this narcosis. In the discussion Israel called attention to the irregularity or instability of the scopolamine, even when Merck's best preparation was used.

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[1] Annals of Surgery, August, 1905, lxii. p. 193.

[2] Ibid., p. 185.

[3] Münch. med. Wochenschrift, 1903, No. 28.

[4] Progressive Medicine, December, 1903, p. 101.

[5] Centralbl. f. Chir., 1905. vol. xxxii. p. 119.

I am still impressed with the fact that the very large dose of morphine and the instability of the action of scopolamine make this method a dangerous one. However, as a preliminary to general narcosis used in doses well within safety it can be recommended.

General Anæsthesia Produced by Ether given per Rectum. I witnessed this method for the first time in Boston, both in the Massachusetts General and at the City Hospitals. Demonstration was made before the Clinical Society of Surgery, which met there in April, 1905. I was impressed that it had a distinct field as the method of narcosis in thoracic surgery, especially when the Sauerbruch[1] pneumatic chamber is employed.

OPERATIVE TECHNIQUE AND WOUND TREATMENT.

In a paper read before the Wayne County Medical Society in Detroit on January 7, 1904,[2] on the relation of surgical pathology to surgical diagnosis, I made the statement that surgical technique is far in advance of surgical diagnosis. For some years the results of the modern technique in operations are about as uniformly good as one could reasonably desire. In the so-called clean cases, if all the details in the scheme of technique are carefully fulfilled infections are of such rarity that they can be practically excluded. In looking over recent literature I can find very little, if anything, to add to the remarks made on this subject which was introduced in Progressive Medicine for December, 1899. Rubber gloves have become almost universal. There is only one objection to their use—the expense—but I believe this is not sufficient to be given any consideration. If there is to be economy it should be employed in other directions. Methods of sterilization of the skin differ, but the consensus of opinion favors the combination of the mechanical cleansing with soap and water and the chemical disinfection with ether, alcohol, and a solution of bichloride of mercury. In addition, it is my personal opinion that the use of permanganate of potash followed by oxalic acid is an additional safeguard. Everything that comes in contact with the wound can be made absolutely sterile by steam, dry heat, or boiling in water, to which washing soda should be added. It is quite true that boiling injures the temper and frequently dulls the edge of the knife. The problem of a sharp knife is an important one in operative surgery. If one does not need to be especially economical numerous knives kept sharp can be sterilized by boiling. This is the simpler method.

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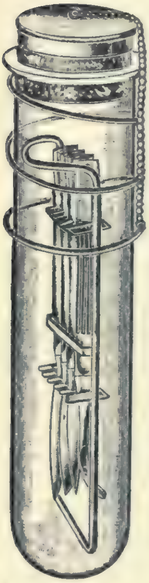
[1] Archiv f. klin. Chir., 1904, vol. lxxiii. p. 796.

[2] Detroit Medical Journal, February, 1904.

Otto Grosse[1] discusses all the methods of *sterilization of knives*, and concludes that his method is the best to preserve the temper of the steel and the sharpness of the edge. Fig. 8 illustrates the closed glass tube in which the knives are placed for steam sterilization. The principles are the same as Halsted's method of sterilization of silk, which he introduced in 1889. The silk is rolled on glassed bobbins, placed into a glass tube, and stopped with cotton. If this method of Grosse really preserves the temper and sharpness of the knife it is one to be recommended. He claims that no moisture gets to the knives within this closed glass tube.

FIG. 8



There is still great difference of opinion in the selection of *suture material*, but it has been my opinion for many years that the results of buried silk are the test of the technique of the individual surgeon and the operative clinic. Before the introduction of gloves in Dr. Halsted's clinic there was a large percentage of suppurations in cases of hernia from the buried silk. Silver wire was then substituted for silk, with the distinct reduction of the percentage of suppurations. The reduction, however, was much more marked after gloves were worn by everyone connected with the operation. Now, silk is again the suture material; the percentage of perfect healings, with gloves and silk, is just as great as with gloves and silver wire. In Dr. Halsted's clinic silk is used with absolute impunity in clean cases. Infections from buried silk in these cases are unique.

The next most important point in technique is to cover the bare arm with a *sterilized sleeve* or have the gown made with sleeves. It is a just criticism to state that in too many clinics one sees too often the ungloved hand and the unprotected arm. It is a travesty upon scientific technique to observe the surgeon operate with gloves and see his assistant or nurse handle the ligature with the naked hand.

When I have operated in other hospitals with which I was not connected I have had the statement frequently made to me by the surgeons in charge that they did not dare use silk, as they always had infections or secondary stitch abscesses. Whenever this statement has been made there was no difficulty, even from a superficial observation of the technique, to understand the reason. The problems, therefore, of surgical technique in clean operations are settled. One only has to have a reasonable understanding of the principles of making a pure culture in bacteriology in which all the factors of preventing contamination are brought out. In addition to this knowledge of preventing contamination one must train one's self in such a way that during an operation these means of keeping within the bonds of asepsis becomes a second nature.

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[1] Archiv f. klin. Chir., 1905, vol. lxxvii. p. 274.

The difficulties of preventing contamination of a wound from outside infection are as slight as the difficulties of treating a wound already infected are great.

The Treatment of Infected Wounds. The problem here is a much more difficult one. Every traumatic wound not made under aseptic precautions must be considered as contaminated from sources outside the body. The principles of their treatment will be discussed under compound fractures. I should like, however, to call attention to the use of *iodine*, especially in the form of iodoformized gauze, and recommend the reading of Nicholas Senn's recent contribution in the new *Journal of Surgery, Gynecology and Obstetrics*, published for the first time in July, 1905, vol. i. p. 1. There is every experimental and clinical evidence that the iodine compounds, especially iodoform, have a distinct antiseptic value when mixed with blood or the secretions of wounds. For this reason iodoformized gauze is better for packing an open wound when this is indicated. I constantly employ iodoformized gauze as a sponge in wounds in which I fear contamination from without or within. Whenever a blood clot is left to fill the dead space it should be mixed with iodoform.

Von Mikulicz[1] and his Japanese assistant, Miyake, have interested themselves in the problem of increasing the local resistance of the tissue and the general resistance of the patients. Their clinical and experimental work seems to prove that *salt solution* increases the local resistance and preliminary hypodermic injections of *nuclein* the local and general resistance. I have had no experience with nuclein, but we use salt sponges constantly in wounds and in all abdominal work in which the lumen of the intestine or gall-bladder is opened; salt sponges are preferred to dry gauze for this reason.

I find nothing new in the literature in the use of *carbolic acid*. Apparently there is nothing more to be said on this most important therapeutic agent. I will describe its use in compound fractures later on. I would urge the general practitioner to familiarize himself with the antiseptic value of carbolic acid followed by alcohol. I have constantly referred to this in the previous numbers of Progressive Medicine.

In the treatment of wounds after they have become lined with granulation tissue, *balsam of Peru* should be used in conjunction with iodoform. The recent experimental work of Schloffer[1] demonstrated that it is of equal value to the iodine preparations.

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[1] Mittheilungen aus den Grenzgeb. der med. u. Chir., 1904, vol. xiii. p. 719, and Archiv f. klin. Chir., 1904, vol. lxxiii. p. 347.

FRACTURES.

Compound Fractures. This subject I have not previously discussed except briefly in regard to primary amputations in PROGRESSIVE MEDICINE for December, 1899. The treatment of a compound fracture is of far greater importance as regards the life of the patient and the saving of the limb than a simple fracture. It is an accident that may occur anywhere. As the results of treatment depend so much on the immediate decision as to the proper measures, it is a surgical disease which every practitioner, especially those not in large cities near hospitals, should be prepared to meet properly as an emergency. Important as this subject is its literature is not large. For this reason I find with great satisfaction a very comprehensive discussion on this subject from the clinic of Professor Wölfler,[2] in Prag, by Oscar Klauber. I have read this article of seventy-nine pages with the greatest of pleasure and profit. A discussion of this contribution will allow me to bring out what may be considered the essential features in the treatment of compound fractures of the extremities.

Klauber's classification impresses me as one of the best, and I shall consider the subject under his four headings. 1. Traumatic amputations. In this group we are called upon to treat the ragged stump from which the limb has been partially or completely torn by the traumatism. 2. Cases in which a primary amputation has been done immediately because of the nature and extent of the compound fracture. 3. Volkmann's débridement. In this group the rather extensive operative procedure first advocated by Volkmann in 1877 consists not only of a thorough disinfection after a wide opening of the soft parts about the fracture, but a resection of the ends of the bone and their immediate approximation by suture, and, if indicated, a removal of extensively injured soft parts. 4. The conservative treatment. In this group the fracture is reduced just as we would reduce a simple fracture, the wound and the surrounding skin are thoroughly cleansed, in some cases the wound is closed, with or without drainage, in other cases it is left open with or without introduction of drainage. Now and then a cavity due to hemorrhage is incised; in a few cases, if the bone protrudes, it has not been disturbed until the possible danger of infection has passed.

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[1] Archiv f. klin. Chir., 1905, vol. lxxvii. p. 789.

[2] Beiträge zur klin. Chir., 1904, vol. xliii. p. 319.

In the treatment of compound fracture we must always recollect that we have two factors to consider which are seldom present in the treatment of a simple fracture: the saving of the patient's life and the saving of the limb. We cannot in the first days give the same consideration in all cases to that perfect reduction of the fragment which is the chief consideration in a simple fracture. The first question that arises when we see a compound fracture is, Shall we amputate? If amputation is not indicated, shall we do nothing practically, that is, follow the conservative method, or is the extensive débridement of Volkmann indicated?

Historically, Klauber calls attention to the fact that in preantiseptic days the surgeon had simply a choice between primary amputation and absolutely nothing, because at that time they had no methods of wound treatment which would prevent or lessen wound infection. The mortality in those days was from 40 to 50 per cent. Billroth reports on 148 compound fractures treated before Lister's work in 1867, with a mortality of 41.1 per cent., while after the introduction of antiseptic surgery, according to Billroth and von Bruns, the mortality was reduced to 9 per cent.

After Lister's publication surgeons felt so much confidence in antisepsis that they proceeded in the treatment of this injury to do more and more from an operative standpoint, and Volkmann, in 1877, published his brilliant experience of 75 cases treated during a period of three years in which there were no deaths and only 8 (or 11.1 per cent.) secondary amputations. Other surgeons, Wagner, von Bruns and others, published almost equally good results. As the experience in preantiseptic days with this traumatic lesion had been so disastrous, and the new experience with the antiseptic method so revolutionized it, it was difficult for surgeons to estimate what part of their treatment was the essential feature. However, experience began to accumulate with less radical measures and simpler treatment, and these observations from different clinics were published and compared, and, as Klauber remarks, gradually the conclusion was forced upon surgeons that in the majority of cases of compound fracture the more radical treatment of Volkmann was not only unnecessary in many instances, but the results of this treatment, although brilliant as compared with those in preantiseptic days, were not as good as the results of the more modern simpler or so-called conservative treatment.

Klauber, however, fails at least to mention that Lister's treatment of compound fractures with pure carbolic acid is practically the so-called modern conservative treatment of to-day. If one will read in the *Lancet* for 1867 Lister's first communications on antiseptic surgery, which consisted of detailed report and discussion on his treatment of compound fractures with pure carbolic acid, he will find that Lister simply disinfected the external wound and the blood cavities about the fracture communicating with the external wound with a swab of pure carbolic acid. The fracture was reduced, little or no cutting was done with the knife, and the wound was sealed with lint soaked in carbolic acid. It is in this communication that we read for the first time observations of the healing of a blood clot, and the healing of a wound beneath a scab composed of coagulated blood and pure carbolic acid.

It was the German surgeons chiefly who, protected by the antiseptic system of Lister, proceeded to do more and more operative manipulations in the treatment of compound fractures until Volkmann's method of débridement was published with his brilliant results in 1877. The reaction took place slowly and, as Klauber remarks, some of the first observations on the good results of the conservative treatment were due to the fact that the environment of the patient prevented any treatment, except simple disinfection and occlusion of the wound with antiseptic gauze. The physician or surgeon who lamented his inability to give the compound fracture more extensive treatment was agreeably surprised to find that his patient did just as well and, as a rule, better than in his experiences with the Volkmann treatment. This observation reminds one of the historical statement of the great French surgeon Ambrose Paré. In his time it was the custom for surgeons to rather extensively treat military wounds, usually pouring into the open cavity boiling oil or something equally painful, which they thought was beneficial. In a battle at which Ambrose Paré was present, the number of wounded was so great that he and his assistants were unable to treat all. The surgeons were intensely surprised to find that the wounded which had not been treated in the great majority of cases did very much better than those subjected to treatment. This observation stimulated Paré to formulate his conclusions of non-interference, which is practically the modern method of treatment of gunshot wounds. Therefore, in the early years of antiseptic surgery, as so frequently happens, the preantiseptic non-interference of Paré and the simple conservative antiseptic treatment of Lister were forgotten, and surgeons again began unnecessary interference with open wounds, not only compound fractures, but gunshot wounds.

Klauber's monograph is therefore the most recent and convincing exposition of the conservative treatment of compound fracture within its indicated field.

This knowledge is a very important and practical one for the general practitioner, because this simple treatment is possible anywhere. It is a very important knowledge which should be impressed upon the younger surgeons in large hospitals who look after the accident service.

In my experience they are apt to interfere unnecessarily with compound fractures. The stage of experimentation with this lesion has passed.

It requires experience and judgment, however, to differentiate the cases of compound fracture into those that require primary amputation, those in which an extensive operation is necessary to save the limb and those in which conservative treatment is not only sufficient but the best. Fortunately, the vast majority of cases belong to the first or last group, and for this reason one who has not had the good fortune to have this expert knowledge can rest assured that in the majority of cases his patient's chances are best if a primary amputation is not absolutely indicated to do nothing except disinfect and cover the wound with a sterile dressing.

When I became connected with Professor Halsted's clinic, in 1892, I found that the methods of treatment advocated now by Klauber from Wölfler's clinic were followed. And the experience of this clinic justifies the treatment.

KLAUBER'S TABLE OF RESULTS.

	No. of cases.	Deaths.	Secondary amputations or reamputations for sepsis.	Average days in hospital.
Traumatic amputations	24	1 pneumonia	2 cases	28
Primary amputations	14	2 delirium	....	43
Primary débridements	15	3 = 20 % { 1 pneumonia 1 sepsis 1 marasmus }	4 = 26.7 % { 2 = 13.3 % died 2 = 13.3 % recov. }	103
Primary conservative treatment	84	5 = 5.9 % sepsis (of these 3 refused operation in proper time)	15 = 17.9 % { 4 = 4.8 % died. 11 = 13.1 % recov. }	57

The above table graphically represents a number of cases in each group, the mortality, the wound complications and secondary amputations, and the average duration of treatment, with a total mortality of 11 (or about 8 per cent.).

TRAUMATIC AMPUTATIONS. It is rather interesting that in this clinic in 24 (or about 17 per cent.) the entire limb was practically completely, and in many instances completely, torn off, with but a single death, from pneumonia. The number of such cases, of course, varies in different localities. The traumatic amputation of the upper extremity is usually due to the arm being caught in machinery and torn off, while in the lower extremity the traumatic amputation is usually after a crush by a wheel running over the limb. In these cases the vessels are generally torn so that the inner coat immediately curls up, a thrombus forms, and the patients are saved from death from hemorrhage. In only 2 of Klauber's cases was collapse very great, and he records no death from hemorrhage. In a few cases of my own experience shock has been a marked feature, but the patients recovered. If death takes place it is usually due to some other injury. These patients, although severely shocked, seldom die except from hemorrhage, and if this takes place death is so immediate that the patient rarely reaches the surgical clinic. For this reason we can accumulate no statistics as to the absolute mortality of this terrible traumatic amputation, but the experience of other surgeons agrees with that of Klauber, that if the injury is confined to the tearing off of a limb and the patients do not immediately die from hemorrhage, their chances of recovery are good. In Klauber's 24 cases, as a rule, an immediate amputation of the ragged stump was performed, if possible to good tissue, or an exarticulation at the nearest joint. He states that, as a rule, the stump in these patients is so benumbed from the injury that the amputation can be performed without an anæsthetic. We can see from his table that the results of this primary amputation or exarticulation have been so good that there has been but one death (of pneumonia) and only two reamputations on account of protruding bone or necrosis became necessary. This experience demonstrates that these patients will stand an operation of some magnitude without great risk.

My own experience has led me to believe that it is better to confine the operative measures to a simple removal of torn and anæmic tissue with the knife or scissors; the ligation of the large vessels, even if they are thrombosed, to prevent secondary hemorrhage (this is also recommended by Klauber). The bone, if it protrudes beyond the soft parts, can be left; later it may be possible to cover it with a plastic flap and so make a longer stump—that is, in these cases I would advise only such operative procedure which will ensure against secondary hemorrhage or sepsis from necrotic tissue. The wound can be left open and packed with gauze. After such treatment the mortality will surely be no greater, but secondary amputations for a perfect stump will be more frequent. Of course, in some cases in which the general condition of the patient does not contraindicate it the higher amputation of Klauber can be done at once. But I would hesitate to advise, unless especially indicated by the condition of the wound, an exarticulation at the hip-joint or shoulder-joint. I have not the statistics of Halsted's clinic at hand, but I do not recollect that we have ever lost a patient by this conservative treatment. Klauber speaks of another possibility in these traumatic amputations; that is, there may be a fracture in the shaft of the long pipe bone, or a dislocation above the position at which the limb has been torn off. In such cases he advises that the amputation be performed at the joint or the fracture, because the danger of secondary infections of the joint or the bone the seat of fracture is sufficiently great to justify this procedure. I have had no experience with such cases.

When we study these 24 traumatic amputations of Klauber we find that in addition to the 2 secondary amputations necessary on account of infection there were three performed to get a better stump and 7 cases which required operations on the soft parts. For this reason I think that my criticism is justified and that in the first treatment in these cases as little as possible should be done; later, when the patients have recovered from their shock and the inflammatory reaction in the open wound has ceased a proper stump, if necessary, can be made.

PRIMARY AMPUTATIONS. Klauber reports 14 cases with 2 deaths from delirium. I should judge from his contribution that primary amputation in compound fracture is only performed when the condition of the limb is such that there is absolutely no hope of saving it. This should be the rule with certain exceptions which he does not discuss, perhaps because illustrative cases did not come under his observation. In the young and robust one would hesitate much longer to perform primary amputation if there was any doubt as to saving the limb than in the old or feeble. We must recollect that in some cases, if we decide to attempt to save the limb, there is bound to be a period of infection. The better the condition of the patient the better the chances of his resistance. Klauber's experience as well as that of all others demonstrates that if an amputation must be done the quicker it is done—within a few hours—the better; that is, the mortality of primary amputation is very small as compared with that of a secondary amputation demanded later by extensive necrosis of the bone, inflammation of the soft parts, specific infections, like gas phlegmons, or gangrene.

The decision, therefore, as to primary amputation, although it rests chiefly on the local condition of the injured extremity, must also be influenced by other factors—the age and condition of the patient and the presence of other injuries. A primary amputation is a simple operation.

The decision as to its indication is sometimes most difficult. Fortunately, in the majority of cases, the decision between amputation and conservative treatment is not difficult. For this reason, as I stated before, the surgeon of limited experience will save the most lives and limbs by primary amputation in cases in which there is no doubt and conservative treatment in the others.

The two great indications for primary amputation are the injury to the blood supply of the limb and so much comminution of the bone that, even if the limb can be saved, it will be functionless.

We now, of course, are considering cases of compound fracture seen within a few hours after the injury. The longer the period of time between the receipt of the injury and the first dressing the greater the opportunities for infection, if the wound is large. This third factor—

the possibility of infection—must also be considered among the indications for primary amputation.

Experience, however, has demonstrated that a limb may be saved with good function even when there are very extensive injuries to the bone and soft parts, provided the patient receives prompt and proper treatment.

The good results of primary amputation are shown in Klauber's table. There were no cases of reamputation for sepsis, there was one reamputation to improve the condition of the stump, and three minor secondary operations on the soft parts for skin defects. These results are unusually good. It is to be noted, however, that all these amputations were performed in the surgical clinic where the environments for technique are the best. This brings up another question, whether primary amputations should be performed at once on the field of the accident, in civil or military practice, where the environment for surgical technique is the worst. It is my opinion that such amputations are contraindicated except for some special indications, which are hard to define. I believe that a majority of patients will have a better chance for recovery if the indicated amputation is postponed until they can be transported to the proper environment. I can conceive only one definite indication for such an amputation, a hemorrhage which can be controlled only by removal of the limb above the point of injury. In such cases the wound should be left open and packed. An illustration of the danger of primary amputation on the field of accident I have recorded in PROGRESSIVE MEDICINE for December, 1899, p. 164. This patient, a strong, healthy man, aged twenty-six years, suffered from a crush of the left leg in a railroad accident. The limb was amputated below the knee at once. He was admitted to the surgical clinic six hours after the accident; the wound had been closed; six hours after his admission to the clinic it was necessary to amputate the limb through the thigh for a gas bacillus infection of the stump; the patient recovered.

VOLKMANN'S DEBRIDEMENT. This extensive operative interference with the injured soft parts and bone undoubtedly is indicated in certain selected cases, and probably will, in such cases, save many a limb. But this operation must be distinctly indicated. We must bear in mind that it is impossible to disinfect an open wound with the same results as the unbroken skin. For this reason our so-called aseptic operations must disseminate the micro-organisms in the wound much farther beyond their original domain, and increases the chances of further infection. The theoretical correctness of this is confirmed by clinical experience, because we find that our very extensive compound fractures which were formerly treated by this débridement do just as well after the conservative treatment, and in some cases better. In addition to the danger of disseminating the infection further separation of the periosteum, removal of loose splinters, resection of the ends of the fragments, not only increase the risks of infectious osteomyelitis, but produce conditions which retard bone union, shorten the limb, and, in some cases, result in pseudoarthroses. Klauber finds in the investigation of the cases in Wölfler's clinic from 1895 to 1903 that twelve of the fifteen operations of débridement were performed in the first three and a half years of this period, and that during the last five and a half years only three compound fractures were subjected to this treatment, and these three in the last six months. In these 3 cases this extensive treatment was substituted for primary amputation in an attempt to save the limb of doubtful cases with good results. Klauber remarks that previous to this time amputations would have been performed in these cases.

It is difficult to describe the special indications for débridement. We must bear in mind that our present experience teaches us that the danger of bone infection is less than of the soft parts, an exact reverse of the former opinion, so that in this operation attention should chiefly be confined to opening, disinfection, and packing with iodoformized gauze soft-part cavities, and to the removal of soft parts which have lost their circulation. The periosteum of the bone should not be disturbed if possible, only bone fragments which are completely detached should be removed; resection of the end of the fragments is indicated only in those cases in which they are badly crushed or in which reduction is impossible. Another very important suggestion of Klauber is worthy of repetition here. In these very serious cases in which the possibilities of secondary infection are great, not only should there be extensive iodoformized gauze packing of the soft parts, but the ends of the bone should be separated by gauze. Later, after the danger of infection has passed, or the evidence of its inflammation subsided, the bones can be united by secondary suture. This method of treatment is one not well understood in this country.

The Conservative Treatment. The principle of this is noninterference. The skin about the wound is disinfected as in other operations. Klauber confines his disinfection of the wound to salt irrigation and sponging the cavity with iodoformized gauze. In these cases now and then an incision is made to open a soft-part cavity; a completely separated fragment of bone, if exposed in the open wound, should be removed; the bone and its periosteum at the seat of fracture is not disturbed. Klauber in a few cases of oblique fracture in which one of the fragments projected through the wound left the parts undisturbed for reduction a few days later. In my experience this is pushing conservative treatment to unnecessary lengths unless the patient came under observation a number of hours after the accident in which the chances of infection of the protruding fragments were greater than usual. It does not seem necessary to discuss his results in detail. They are unusually good. The principles of the conservative treatment have been clearly defined.

When we have decided that amputation is not indicated and have treated the compound fracture either by the conservative or the débridement method, we must remember that for some days such a patient needs vigilant attention. In these cases the hand and foot should be left partly exposed so that any change in the circulation of the limb can be observed at once. Signs of gangrene indicate immediate high amputation. Fever and leukocytosis demand that the wound be investigated at once, the packing removed, the wound irrigated. The presence of emphysema of the tissues and the characteristic bacillus in the cover-slips of the secretion of the wound also, as a rule, indicate immediate high amputation.[1] With the exception of the gas bacillus infection the longer the local and general signs of infection appear after the injury the better the chances for saving the limb. Our knowledge of wound healing teaches us that in these injuries granulation tissue is immediately produced over all torn surfaces and that this granulation tissue is nature's protection against absorption. We combat infection in these cases by freer incisions and more frequent dressings of the wound. When infection, however, takes place it requires very accurate judgment to decide whether we should amputate at once or delay in an attempt to save the limb. The dangers of delay are death from general infection. If an amputation is really necessary the longer it is postponed the greater the danger. The surgeon, therefore, finds great difficulty in the decision, between his anxiety to save the limb and that of delaying the amputation too long.

Fortunately, however, as I stated before, in the ordinary healthy individual the probabilities are that the limb can be saved by proper treatment. Vigilant observation will detect in time the specific indications for secondary amputation.

The following case will illustrate the conservative treatment of a compound fracture.

Case. *Fracture, compound, recent, tibia at junction of lower and middle third; one comminuted fragment; operation twenty-four hours after injury.*—The injured man was a farmer, aged thirty-one years. Twenty-eight hours before operation a telephone pole struck the calf of his right leg and fractured the tibia in such a way that the shaft of the bone was bent with the angle of the fracture forward. The upper fragment tore through the skin and protruded, but the open wound was covered with the untorn drawers and trousers. For this reason the only possible sources of infection were the skin of the patient and his underclothing. As directly after the injury there was free hemorrhage, some organisms were probably washed away. When his physician saw him two hours after the accident the protruding bone in the wound was covered with blood clot. Nothing was done but disinfection of the wound and surrounding skin with a solution of sulphate of copper. Extension of the foot did not reduce the fragment. The wound was covered with wet antiseptic gauze and put in a splint. The patient was brought to Baltimore to the hospital. There had been no shock and his condition twenty-eight hours after the accident exhibited no local or general signs of infection. The wound was covered with an organized blood clot. The leg was shaved and the skin properly cleaned. The exposed wound was disinfected with pure carbolic acid, followed by alcohol. It was then found that the upper fragment rested upon the skin, which projected slightly beyond the lower fragment. This skin was divided for about 2 cm., which allowed immediate and perfect reduction of the fragment. The periosteum was intact over both ends and over a small fragment. The bone and this periosteum were not further disturbed. The wound was irrigated with salt solution and frequently sponged with iodoformized gauze. The ragged skin edges of the lacerated wound produced by the upper fragment were excised. Torn bits of fat and muscle aponeurosis were excised. There was a cavity between the bone and the skin to the median side of the fracture. As it was twenty-eight hours since the accident, complete closure of the wound was contraindicated. At this time, on account of swelling and hemorrhage, complete approximation was also contraindicated on account of the tension which would have been necessary. The wound was therefore but partially closed without tension. This left a line of fracture partially uncovered by skin; to cover this would have required a plastic operation on the skin. Any further skin incisions were contraindicated on account of the danger of interfering with its circulation, and as the bone retained its periosteal covering a plastic operation to cover the bone was not necessary. This is a very important fact to bear in mind in the treatment of compound fractures. When the bone is denuded of its periosteum one must cover it with skin, or if this is impossible, with muscle. On a number of occasions I have covered the denuded shaft of the fractured tibia, when there was a large skin defect, by a simple plastic operation on the muscle bundles to each side of the fracture, with good results.

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[1] Progressive Medicine, December, 1899, p. 164.

The cavity mentioned above to the median side of the fracture was drained with a small piece of rubber tissue; the open wound was covered with narrow strips of rubber tissue; this manœuvre allowed free efflux to the secretions and at the same time prevented the covering of the iodoformized gauze from becoming fixed to the granulation tissue which would rapidly form. The convalescence in this case so far has been uninterrupted.[1]

I agree with Klauber in his remarks in regard to the use of plaster-of-Paris dressings in compound fractures. These cases for the first few days, until good circulation is re-established and until the danger of infection has passed, should have a simple dressing which contains plenty of sterile gauze to absorb secretions and no bandage which produces any constriction, a dressing which will allow easy access to the wound. The so-called window plaster-of-Paris cast as an early dressing is to be condemned. The absolute fixation of the fragments up to at least ten days is not necessary.

Simple Fracture. SUBPERIOSTEAL FRACTURES. The *x*-ray has demonstrated that we frequently overlook simple fractures, especially those in which in spite of the loss of continuity in the bone there is no displacement of the fragments. When this fracture occurs near a joint the clinical diagnosis of a sprain or traumatic arthritis is frequently made. If the injury is at the ankle a flat-foot may develop, at the hip a traumatic coxa vara, at the wrist a weak joint. In the shaft of a bone, on account of the local tenderness, a diagnosis of bone contusion is made, and if callus forms afterward, traumatic periostitis. In many of these fractures without displacement the so-called subperiosteal fracture, the non-recognition of the nature of the lesion is not harmful, unless on account of burdening there is a slowly forming resultant deformity which with bony union prevents correction without refracture. At the present time, therefore, we should be more insistent about an *x*-ray examination in those cases which occur after an injury from which a fracture is possible, yet in which our examination for fracture is negative. Hennig,[2] the marine surgeon assigned to the surgical clinic in Kiel, reports on seven subperiosteal fractures observed in this clinic during the past three years. Fig. 9 illustrates a tracing of an *x*-ray, anteroposterior view, of a child aged six years. The irregular transverse line demonstrates a supracondyloid fracture of the humerus without displacement. We note at this age an ossification of the internal condyle (*a*) which is not displaced, and of the capitellum (*b*). The absence of any shadow for the external epicondyle and trochlea demonstrates that at six years of age these centres of ossification are still cartilage. The subject of fractures of the elbow in children and the ossification of the bones forming this joint I have previously discussed in great detail.[3] The capitellum which we see in this figure appears in the third year; the internal epicondyle, which is also seen, at the fifth year. The other centres ossify later. For this reason this picture is correct for the sixth year.

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[1] October, 1905. The patient made a good recovery.

[2] Deutsche Zeitschr. f. Chir., 1904, vol. lxxv. p. 262.

[3] PROGRESSIVE MEDICINE, December, 1900, p. 135.

The patient in this case fell on his elbow; there was no deformity, no restriction of motion, nothing but slight swelling and tenderness of the humerus a little above the joint. As a rule, in children this fracture is associated with considerable dislocation of the fragments, illustrated by x-rays in Progressive Medicine for December, 1900. Whether any loss of function would have resulted if the fracture illustrated in Fig. 9 had been overlooked I do not know; I am inclined to think not. Yet it is quite possible that before bony union had taken place a second slight injury would have displaced the fragment. In Fig. 10 a child of nine years fell on the dorsal surface of the left hand and was admitted to the clinic with pain in the wrist and elbow. The clinical picture of a supracondyloid fracture of the humerus was sufficient to make a diagnosis, but the transverse fractures of both bones of the forearm on the same side would have been overlooked but for the x-ray. This combination of fractures is unique, the first I have found. Hennig does not state whether the child was rachitic or not. In this disease subperiosteal fractures, single and multiple from an indirect trauma, are not infrequent. Fig. 11 illustrates a transverse fracture of both bones of the leg without displacement. The patient, a male aged eighteen years, fell to the ground, after which a trunk which he was carrying on

Fig. 9

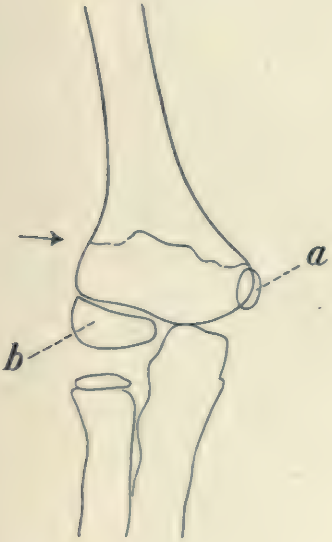
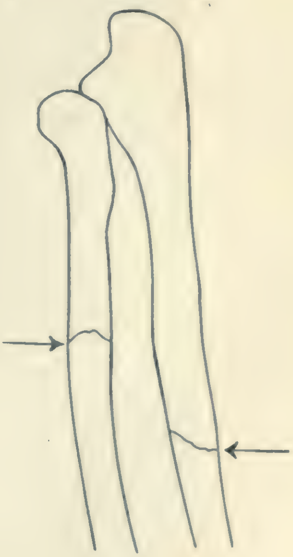


Fig. 10



his shoulder fell on the calf of his leg. At the examination there were no symptoms except local tenderness over the tibia and a slight ridge at the line of fracture. The case is of interest to me because the etiology of the fracture is the same as the one which I have just discussed in detail under compound fractures, except that in my observation the tibia was bent forward and the upper fragment pushed through the skin. After I reduced the fragments there was so little separation of the periosteum, although it was completely torn, I am inclined to think that had it been a simple fracture it would not have appeared any different clinically or in the x-ray after the reduction than the so-called subperiosteal fracture in Fig. 11. That is, the term subperiosteal can be criticized in a clinical diagnosis because it is impossible, except by operation, to demonstrate whether the periosteum is torn.

Fig. 11

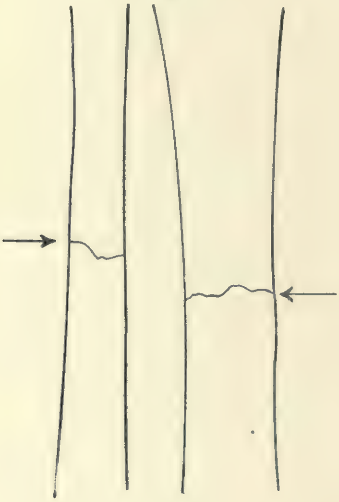


Fig. 12

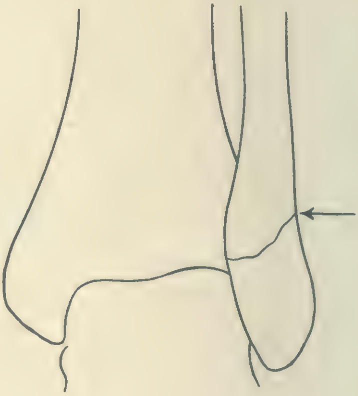
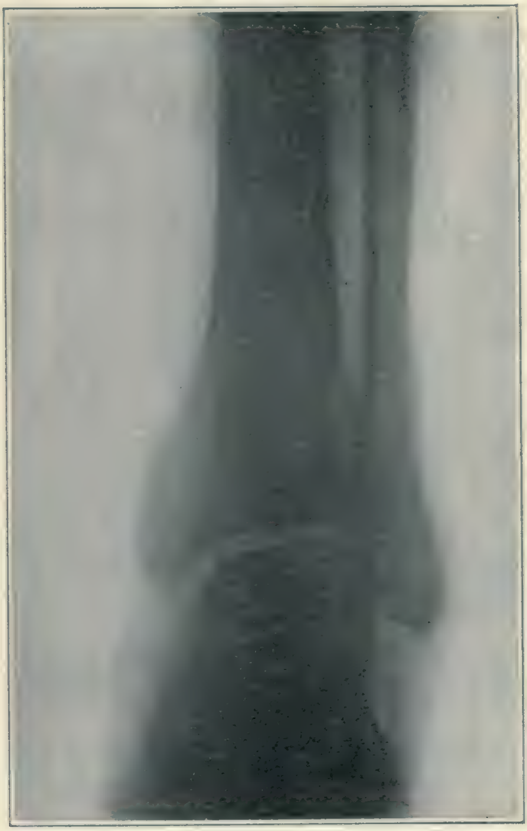


Fig. 12 is a good illustration of a fracture of the external malleolus without deformity, one in which, without the aid of x-rays, the patient would probably have been treated for a sprain, and in which without much doubt a flat-foot would have resulted. This patient, a man aged twenty-seven years, made a misstep, fell and twisted his ankle. At the examination there was a little swelling, some pain and tenderness over the malleolus, but no line of fracture.

Recently, I have had a somewhat similar observation. There was no displacement, but I did get crepitus; there was a little œdema and tenderness over the line of fracture, and one could make out that the line was not transverse. Crepitus was audible if I put a stethoscope near the fracture and percussed gently above. The *x*-ray (Fig. 13) shows the spiral fracture above the malleolus in the shaft of the fibula.

AUSCULTATION AND PERCUSSION IN THE DIAGNOSIS OF FRACTURE. Johann Plesch,[1] of Budapest, as far as I am able to ascertain, must be given credit for a new method of diagnosis of fractures which is especially applicable to the variety of fractures which we have just discussed. The apparatus necessary is so much simpler than the *x*-ray that it will appeal to the practitioner as one which should be tried. The Plesch method rests upon the fact that bone will transmit sound. When the continuity of the bone is interrupted, but the ends are still in contact, the sound will differ; that is, it will be interrupted and lessened; if the bones are entirely separated the sound will probably be completely interrupted. For this reason if one places a stethoscope, or, better, a

FIG. 13



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[1] Deutsche Zeitschr. f. Chir., 1903, vol. lxix. p. 613.

phonendoscope, on one end of the bone and percusses at the other end, one will be able, when his hearing has been trained, to distinguish those differences in sound which indicate a fracture. Plesch's experiments on the cadaver and his practical experience are pretty conclusive that this method is accurate in regard to fractures, and he is inclined to the view that it can be amplified and made useful in the diagnosis and location of other bone lesions. In two instances he was able to localize a focus of osteomyelitis in the rib and tibia.

Another very important fact is that the sound will be transmitted through the neighboring joint. This is important because in some cases on account of the deep position of the bone, or of the surrounding traumatic swelling, it is impossible to place the stethoscope on the other end of the bone. For example, in a possible fracture of the surgical or anatomical neck of the humerus the head of the bone, if there be no swelling, is usually too deep for auscultation. Plesch has demonstrated that the sound will be transmitted and its variations audible if one places the phonendoscope over the acromion process and percusses over the lower epiphysis of the humerus. It is important always, of course, to compare the sounds heard on the affected side with those on the normal.

This method of diagnosis, if it prove to be accurate, is a very important one, and for this reason the following details of its application for diagnosis of fractures in different parts of the body are worthy of record.

In fractures of the skull one should listen on one side of the suspected area and percuss on the other. Experiments on the cadaver have demonstrated that the transmission of sound is influenced by the slightest crack in the skull, and completely interrupted by a fracture. In order to establish impaired transmission of sound, however, it is necessary to compare it with that over the corresponding point on the other side, since the sutures and fontanelles in children and youths, before ossification is completed, are apt to interfere with this transmission. Careful comparison will exclude this factor.

In fractures of the ribs, in which a probable diagnosis was heretofore the best that could be obtained, percussion over the sternum and, in thin individuals, on the rib, or over the spinous processes of the vertebræ, with auscultation over the rib, will diagnose and locate a fracture.

In pelvic fractures percussion is indicated over the crests of the ilium, anterior spines, os pubis, os coccygis, or other areas directly accessible.

A fracture of the scapula can be located by percussion of the acromion, coracoid process, the spine, or the angulus. In fractures of the clavicle the seat of the fracture will determine the place of auscultation.

When the upper arm is fractured in the diaphysis, one of the condyles; when the fracture is in the surgical or anatomical neck, the acromion; when in the condyles the olecranon of the ulna should be percussed.

In fractures of the forearm involving the lower part of the ulna or radius, or the styloid process, we auscultate on the thenar or hypothenar of the well-extended hand, according as we wish to examine the ulna or the radius.

It will probably be impracticable to employ the method in fractures of the carpal, metacarpal bones and phalanges on account of their small size, though theoretically this should be possible.

Among fractures of the lower extremity, those of the neck of the femur deserve special attention on account of the difficulty of differential diagnosis between fracture and dislocation by the old methods. The sound produced by percussion on the patella, the condyles, or the trochanter will be transmitted to the bone of the corresponding side of the pelvis when the head of the femur is in the acetabulum and the bone is not interrupted in its continuity. When the bone is fractured it will show a change in the transmission of the sound as compared with the other unaffected side. The sound may also be transmitted to the opposite end of the bone by percussion on the prominence of the pelvis. The method will, therefore, aid in the differential diagnosis between fracture and dislocation of the femur where other methods fail.

As regards its employment in fractures of other bones of the lower extremity the same principles apply as those discussed in connection with the upper extremities.

Incomplete Fractures. This term is frequently incorrectly used and it is somewhat hard to define. Stimson in his classical work divides incomplete fractures into (1) fissures, (2) the true incomplete, other terms for which are the green-stick, infraction, bent-bone, or curvature without fracture; (3) depressions, (4) separations of a splinter. Von Bruns has demonstrated that in young children a bone may be bent almost to a right angle and after the force of the bending has ceased it returns to almost its normal position without any definite separation of its continuity. According to the experimental work of Gurlt an infraction is a fracture in which the continuity of the bent bone is partially or completely interrupted; at the concave side of the bend the corticalis is folded into a ridge; at the convex, opposite side, there is a separation.

Apparently there is every degree from a bending to a complete fracture, and recent *x*-ray studies illustrate a fracture which may be considered less in its extent than the true infraction of Gurlt. Kohl[1] reports, with illustrations, from the surgical clinic of Leipzig a few of these cases which he calls a special form of infraction with folding of the corticalis of bone. He has had three such observations, all in children between five and eleven years of age. In these cases the direction of force was apparently identical to that which would produce a Colles' fracture in the adult. The children fell on the plantar surface of the fully extended hand, with the forearm fully extended. This, of course, would tend to bend the radius with the convexity on the extensor side and concavity on the flexor side. Apparently in this bending the tension force of the concave side of the bend stretches the lamellæ of bone, but does not produce any fracture, at least not enough separation of continuity to be made out in the *x*-ray picture. The picture is taken from the flexor side of the radius, but on the extensor side, the concavity of the bend, the pressure forces the cortical bone together and produces a folding or wrinkling. These cases are of interest as rare forms of fracture. Clinically there is no deformity, but localized tenderness and a little swelling about the radius 3 cm. above the styloid process. They can be recognized only by the *x*-ray; reduction under anæsthesia is unnecessary, a simple fixation dressing for ten days or two weeks being sufficient for the proper treatment. If in these cases the force is greater or the individual is older the convex flexor side of the radius gives way and we have a true infraction, but the folding of the cortical bone on the opposite concave side is also present. The patient in this case was older, seventeen; in addition to the local tenderness and swelling there was a slight deformity. The *x*-ray shows well the folding of the cortical bone, the ragged line of fracture and the slight angular displacement. In this case it was necessary to give ether and reduce the deformity. In looking over his *x*-rays Kohl was able to find one other case of this special form of infraction. The ridge of cortical bone is well illustrated here at about the surgical neck. In this case there was no deformity and no restriction of motion at the shoulder-joint, no symptoms except tenderness and swelling about the bone a few centimetres below the head.

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[1] Deutsche Zeitschr. f. Chir., 1905, vol. lxxvii. p. 383.

I have discussed these cases because they are the first to appear in the literature. Whether such a fracture can occur at the neck of the femur and later develop into traumatic coxa vara we have no observations to decide.

THE OPERATIVE TREATMENT OF FRESH SIMPLE FRACTURES. This subject we have previously discussed, taking a rather conservative view. Since this time the most extensive and, I am inclined to think, the best presentation of our views in this matter has appeared by Fritz König,[1] in Altona. His historical review and discussion of the literature are well worth reading. However, we shall confine our remarks entirely to the indications for operative interference which König from his own experience and that in the literature considers justifiable.

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[1] Archiv. f. klin. Chir., 1905, vol. lxxvi. p. 725.

In my discussion of the treatment of compound fracture I brought out the fact that non-interference was now the accepted view of the authorities and that extensive operative interference was only justifiable in certain selected cases. With this knowledge the general practitioner has, with the proper use of antiseptics, all that is necessary for the proper treatment of the majority of cases of compound fractures. The same is true in regard to fresh, simple fractures. The great majority of these cases are best treated by reduction under narcosis and a simple splint and extension dressing to keep the fragments in place. In the selected group of cases, for which an operation is indicated, this operation is better performed after a delay from five to ten days after the injury, or, in some cases, as König states, two weeks. The general practitioner, therefore, has ample time to study these cases carefully clinically, get his *x*-ray pictures, and decide whether this case under treatment belongs to the group in which operation is indicated.

The first requisite for operation in this group of cases is an environment in which absolute aseptic surgery is possible. With modern surgical technique the danger of infection in these cases is so small that it need not be considered as a contraindication for operation. However, when such an environment is not possible and the one treating the fracture has not had considerable experience, the possibility of a bad result in the healing of the fracture does not weigh against the dangers of infection during the operation.

The chief indication for operative interference in a fresh simple fracture is a dislocation of the fragments which cannot be reduced and this reduction maintained, provided that healing in the unreduced position will interfere with proper function. For example, in some of the oblique and spiral fractures of the shaft absolute reduction, that is, perfect anatomical adaptation of the fragments, is impossible. However, in many cases, there is good healing, and the deformity is so slight that it does not at all interfere with the function of the limb. In previous numbers of PROGRESSIVE MEDICINE I have discussed these spiral and oblique fractures of the long pipe bones and have advocated the conservative treatment similar to König. It is quite true that there is no special objection to operation to allow a more perfect apposition of the fragments, but it is unnecessary, except when the *x*-ray shows wide separation, or a deformity which, if healing were to take place in its direction, would interfere with function. As a matter of fact, therefore, in fractures of the shaft operative intervention is less frequently indicated than in fractures near the joints. In oblique fractures of the upper third of the shaft of the femur the upper fragment is so frequently dislocated forward and the lower fragment pulled up by the strong muscles that it is impossible, in many cases, even with the heaviest extension in a forced flexed position, to maintain apposition. For this reason operation is distinctly indicated.

In all fractures in the neighborhood of joints a slight dislocation of the fragment, if it heals in this position, interferes with perfect function of the joint. For this reason results undoubtedly will be better if these cases are subjected to operation in the recent stage. However, it is to be emphasized that experience so far has demonstrated that the details of the operation in this group of cases are far more difficult than in operations upon the shaft of the long pipe bones. In all fractures of small bones of the foot and hand, tuberosities, etc., in which there is attached to the small fragment a muscle, which tends to keep that fragment apart, an operation is indicated. This is true in some fractures of the os calcis, the tubercle of the tibia, the great trochanter of the femur, and the tuberosity of the humerus.

The possibility of non-union of the apparently perfectly approximated fragments is so unusual and so difficult to prognosticate, that this cannot be considered, at least at the present time, as an indication for operation. As a matter of fact, we do not yet understand these unique cases; their occurrence is noted most frequently in the middle shaft of the humerus, and next, in the middle third of the tibia. It is difficult to believe that operative fixation would, in the recent state, give any better results. Experience teaches that after resection and wiring in these cases of non-union osseous union does not always take place. Of course, if one finds between the fragments fascia or muscle there is an explanation. This should show in the early *x*-ray and would be an indication. The causes of delayed bony union when the fragments are in perfect position are not well known. Among these causes, the majority of authorities agree, are two which are the fault of the surgeon in his treatment—one, the neglect of massage which improves circulation; and the other, prolonged fixation in too tight dressings which interfere with circulation. In the few cases of non-union which I have observed these two factors were present. Syphilis is another factor; this, however, can be recognized and treated. The relation of the thyroid gland to bone formation is now pretty well understood; thyroid extract is for this reason indicated in all cases of non-union. I have amplified this question of a possible non-union more than König. I agree with him that it is not an indication for operation, nor do I feel that delayed osseous union is an indication for interference. Given a case in which the bones are in apposition, usually the shaft, and in which after the proper time the union is not solid, this finding is not an indication for operation, but one for energetic massage, ambulatory treatment in the fixation dressing, thyroid extract, antisyphilitic drugs, and a treatment calculated to improve the general nutritive condition of the patient. In the few cases which I have seen bony union has been accomplished after a time. In one case, the middle third of the tibia, the patient wore a support one year.

In two special fractures an operation is indicated without exception, if this can be done under the proper environment already referred to: fractures of the *patella* and *olecranon*. It is quite true that good results have been obtained without operation; it is also true that if the ligaments about these bones are not torn good function is obtained even with fibrous union. There is, however, no way in which we can tell to which class that patient under consideration belongs. It is safer, therefore, to operate upon these fractures. König mentions a preliminary treatment which should be emphasized. For five or ten days after the injury and before the operation the elbow or knee-joint should be given energetic massage.

The results in fractures of the neck and head of the femur are so uncertain and frequently so unsatisfactory that König considers them among those special fractures in which operation must be considered. I will discuss this difficult question later under special fractures in the neck of the femur.

Special Fractures. FRACTURES OF THE NECK AND HEAD OF THE FEMUR INCLUDING COXA VERA. König[1] in his discussion of the operative treatment of simple, fresh fractures, devotes more space to the subject of fractures of the neck of the femur in adults than to any other single fracture. In the previous numbers of PROGRESSIVE MEDICINE the literature on coxa vara has been fully discussed up to date, and along with this discussion fracture of the neck of the femur in adults has been considered. The operative intervention was suggested in certain selected cases. In recent years considerable experience has accumulated which is best discussed by König on fractures in the adult, and by Whitman[2] in children.

It is very difficult in a few words to give the present opinions on this subject. Everyone is aware that in fractures of the neck of the femur in adults treated by the usual method of extension or in a plaster-of-Paris cast we get various results. These results may at first be divided into two groups: (1) those with non-union, and (2) those with union. The cases of non-union are practically cripples. The anatomical result in the cases of union varies in regard to shortening, adduction, rotation, and limitation of motion. The functional result is somewhat in proportion to the anatomical. In many of the cases in which there is union the deformity is so great and function is so much impaired that the patients are almost cripples. The two questions, therefore, to decide are, how can we ensure union in all cases, and when we get union, how can we accomplish this without a resultant deformity which impairs function? In adults fractures of the neck of the femur, from the time of Sir Astley Cooper, have been divided into intra- and extracapsular varieties, impacted and non-impacted. When the line of fracture is entirely within the capsule, that is, when the fracture is the so-called subcapitalis of Kocher, union takes place in a few rare instances in which the fracture is impacted. It was König's study of a union in such an impacted subcapitalis fracture which lead him to the discovery of the essential feature of healing in these cases. In a case of anteroposterior section through the head, neck, and trochanter the patient had been treated for impacted intracapsular fracture with a good result; the patient died later from other causes. We observe that the head is united to the neck in a slightly dislocated position, that between the head and the neck, on the posterior half there is a distinct line of separation between the fracture surfaces, with no attempt at fibrous or bony union, while on the anterior half there is firm fibrous union between the fracture surfaces (trochanter).

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[1] Loc. cit., p. 762.

[2] Medical Record, New York, March 10, 1904, and Medical News, September 24, 1904, vol. lxxxv. p. 584.

In these fractures, according to König, there are two elements in healing —the bone and the soft parts about the fracture. Former experience has demonstrated if the bone only is fractured and the soft parts unruptured there is healing, because in this instance the loose head gets circulation from the unruptured soft parts as well as the ligamentum teres. Such instances are unique. When bone and soft parts both are torn the head is loose and receives nutrition only from the vessels in the ligamentum teres. This amount of circulation is insufficient, the bone atrophies, and we have as a result non-union and a loose head. In a few cases in which there is impaction the torn soft parts are brought in contact and we get fibrous union with function.

We can distinguish clinically and with the *x*-ray the fracture of the neck of the femur (subcapitalis) in which operation is indicated, from the other fractures, in which union practically always takes place. According to König we can distinguish the intracapsular subcapitalis fracture by the line of separation shown in the *x*-ray, by the greater outward rotation and greater mobility. The operation should be done within eight days after the injury and should consist not only in a bone suture, but a careful approximation and suture of the torn capsule. This method of König is based: first, on the result of the fibrous union ; second, in the poor results when operation is performed late ; and, third, in his one almost perfect result of an early operative intervention.

If the operation is delayed, there is so much atrophy of the neck or changes in the loose femoral head that although suture is possible the results are not as satisfactory as when the operation is performed early.

This atrophy of the neck in intracapsular fracture of the femur has been well known from the time of Gurlt.

In three cases, all old women, in which König operated after the fifth week, he removed the loose head. This has been the operation which Kocher and others have conceived as the only possible method of treatment. In two further cases, a girl of nineteen and an elderly woman, König again operated after the fifth week with his method of suture. In one the bone or the loose head had become so soft and in the other so eburnated that osseous approximation was unsatisfactory, but apparently on account of the suture of the capsule, although the x-ray demonstrates that the head has again dislocated, the functional result was a great improvement over non-union.

Fig. 14

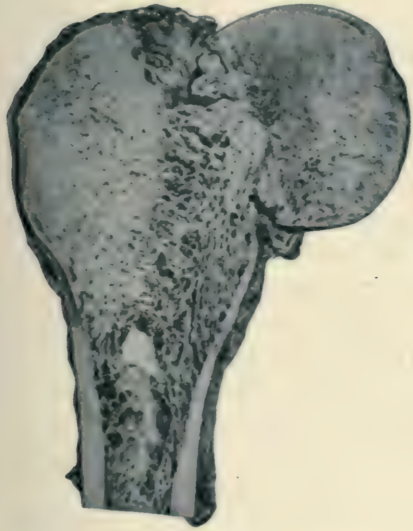
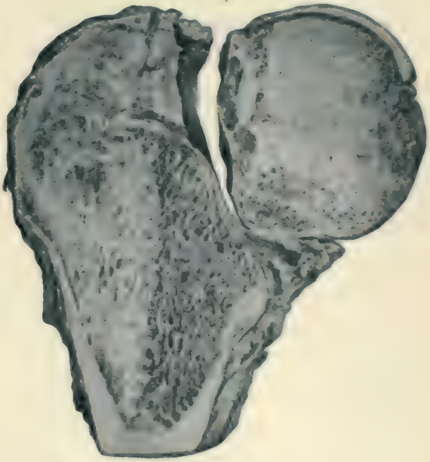


Fig. 15



König, in his sixth case, with this experience and with his ideas crystallized, on the importance of early intervention and suture of the capsule, operated on a male of seventy within eight days after the injury. The result was practically perfect. Some time later this patient was readmitted to the clinic; he walked with a cane, with practically no limp, and could ascend and descend stairs. He was then suffering with tuberculosis of the lungs and ribs, and died from this disease in the clinic. At the autopsy it was possible to remove the upper end of the injured femur. Fig. 14 is a sagittal section through the anterior half; we observe the perfect approximation, and that in a few places bone lamellæ cross through the fibrous union from neck to head. However, when we make a similar sagittal section through the posterior half (Fig. 15), it can be seen that there is no union. König attributes this to the fact that he only sutured the bone and the anterior portion of the torn capsule. In future cases he plans to suture, if possible, the torn portion of the posterior capsule.

Operative intervention is, therefore, indicated early in this form of non-impacted, intracapsular fracture of the femur. This operation should be done within the first eight days. The upper end of the femur is easily exposed by an anterior incision separating the tensor vaginæ femoris from the rectus; the fracture is reduced; with marked outward rotation the posterior capsule is sutured, the fractured bone is approximated with some form of metal suture, or a nail or screw through the trochanter, then the torn anterior portion of the capsule is sutured, and the wound is closed; the leg is put up in slight abduction in plaster. The abduction must not be extreme; passive motion and massage are begun early about the tenth day. According to König, approximation of the bone only in this class of cases, no matter by what method, is insufficient.

Just what future experience will demonstrate as to the value of König's new method cannot be stated, but there is no question that the general practitioner will relieve himself of great responsibility if he will select this form of fracture from others of the neck of the femur, and turn them over early to the experienced surgeon, and so give the specialist an opportunity to see what can be done by operative intervention in these cases which in the past have resulted in non-union.

A clinical and experimental study of two Japanese—Ito and Asahara—from the surgical clinic of Kyoto[1] confirms the conclusions of Kocher that the only treatment for the subcapitalis intracapsular fracture is excision of the head of the bone. They summarize the consensus of opinion also expressed by König[2] that non-union is not due to the absence of coaptation between the bone fragments, but to the shutting off of the circulation to the head fragment because the capsule and periosteum are torn. For this reason they conclude with Kocher that no method of wiring the two fragments will result in union, because for union both fragments must have proper circulation. They miss in their investigation the important findings of König. Yet they have two observations which definitely prove König's view. Among their clinical cases they operated on a woman of seventy-four, within eight days after the accident, for an intracapsular fracture of the neck of the femur; they were prepared to resect, but they found the capsule untorn, and on opening the capsule they found a line of fracture at the junction of the neck and the head. They considered that the fracture was incomplete, no bone suture was done, the opening in the capsule was sutured, the wound healed, and the result has been practically perfect. Undoubtedly this would have happened without operation. This observation confirms König's view that these fractures heal if the capsule is intact. In their experiments on animals in which they produced this fracture the only union which they observed was one in which the capsule on the neck fragment had become fixed by an inflammatory process, perhaps the result of a slight infection to the head fragment. As these two publications were about simultaneous, the Japanese surgeons were not familiar with König's work. It has impressed me, however, as very significant and as a confirmation of König's view.

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[1] Deutsche Zeitschr. f. Chir., 1905, vol. lxxvi. p. 121.

[2] Loc. cit.

Whitman,[1] of New York, considers fractures of the neck of the femur in early life and advocates a new method of treatment which appeals to me very much: for fractures of the neck reduction and fixation in forced abduction, for epiphyseal separation operative reduction of the dislocated head. Whitman's previous communication on this subject has been discussed in Progressive Medicine (December, 1903, p. 135). We shall not again discuss the difference of opinion between Hoffa with many other German authorities, and Whitman in regard to the frequency of fracture of the neck and epiphyseal separation. Hoffa and others are inclined to the view that fracture of the neck is rare in children, while epiphyseal separation is common. Whitman holds the opposite view. This question can only be settled by further anatomical studies. Whitman divides fractures of the neck in early life into three classes: (1) simple, direct fracture of the neck, usually incomplete, occasionally complete; (2) direct epiphyseal disjunction, usually incomplete, in rare instances complete; (3) an indefinite class in which the deformity is at or in close proximity to the epiphyseal junction; the patients are of a type in which the so-called static deformity of adolescence is common; an injury may be predisposing, aggravating, or the direct cause of the distortion. It is probably this classification that is the chief cause of difference between Whitman and Hoffa. German authorities class Whitman's last two varieties under the term traumatic coxa vara, which is a common lesion as compared with true coxa vara.

The following illustrations of Whitman (Fig. 16) represent clearly his view: fig. 1, a fracture of the neck of the femur; fig. 2, restoration of the normal angle by forced abduction; fig. 3, the limb in normal position; figs. 4, 5 and 6 should be compared with figs. 1, 2 and 3, as they illustrate complete separations of the epiphysis treated by the same method, and demonstrate that abduction increases the line of separation between the head and neck; fig. 7 illustrates a slight separation of the epiphysis in which simple protection might assure a satisfactory result; fig. 8 shows a more extreme displacement of the head, which can only be properly treated by open incision and reduction; fig. 9 represents the form of epiphyseal coxa vara which is often induced or aggravated by injury in which the deformity is most marked on the outer side of the epiphyseal cartilage.

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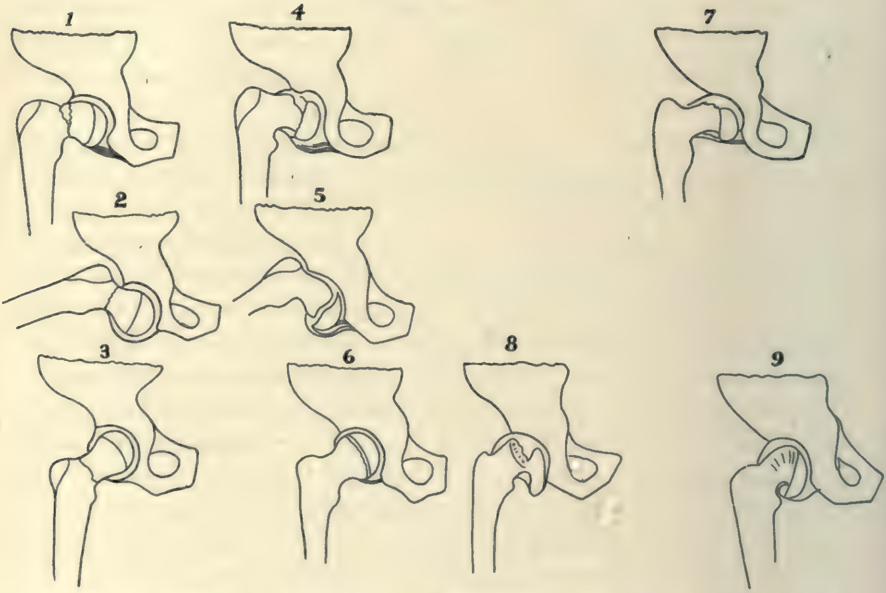
[1] Loc. cit.

FIG. 16



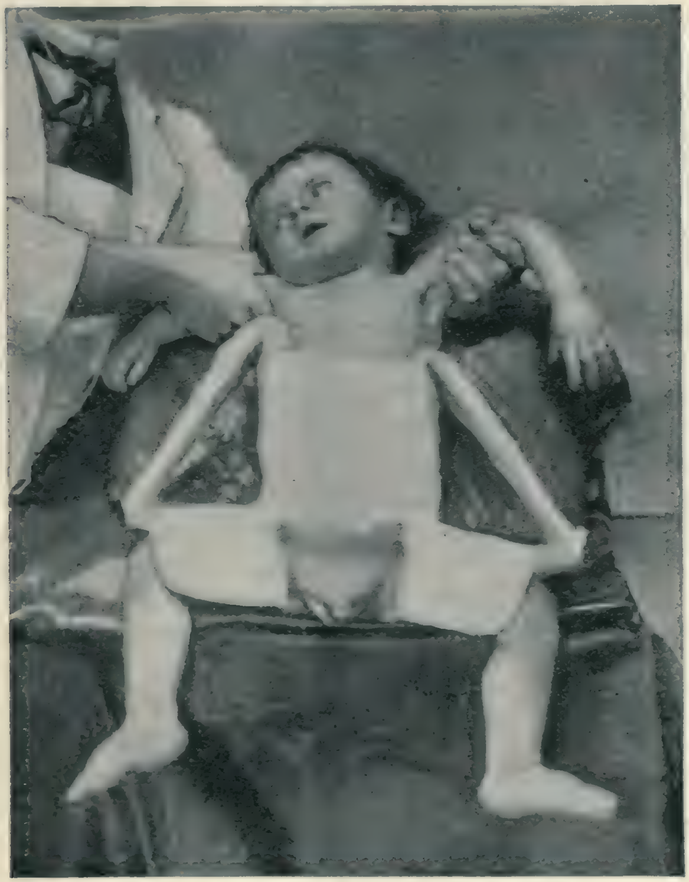
1. Fracture of the neck of the femur. 2. Restoration of the normal angle by forcible abduction. 3. The limb in normal position. 4, 5, and 6 illustrate complete separation of the epiphysis of the head of the femur treated by the same method. 7. Illustrates slight separation in which protection might assure a satisfactory result. 8. More extreme displacement, that can only be treated by direct operative reposition. This contrasted with fracture of the neck (1) illustrates the greater disturbance of joint function that must inevitably result. 9. A form of epiphyseal coxa vara often induced or aggravated by injury in which the deformity is most marked on the outer side of the epiphyseal cartilage.

Whitman's two groups, in regard to treatment, correspond to König's. In fracture of the neck of the femur, in children as in adults, operation is not indicated; in epiphyseal separation with displacement of the head, in children, operation is indicated to reduce the head, while in adults in the subcapitalis fracture operation is indicated to suture bone and capsule.

In children the two varieties can be differentiated clinically and with the x-ray. In fracture of the neck there is more shortening, less outward rotation, and the trochanter is more prominent; motion at the hip-joint is practically free, except in abduction, which is particularly restricted when the limb is flexed.

In epiphyseal separation the shortening is less, the outward rotation greater; frequently there is a swelling to be palpated in Scarpa's triangle over the position of the head; the trochanter is not as prominent, but motions at the hip-joint are always more restricted, due to dislocation of the head, and reflex muscle spasm due to the traumatic synovitis with effusion. Whitman gives illustrative cases of the results of treatment. His experience has been large, and his communication is one of great value.

Fig. 17



I consider that the space just taken for the discussion of recent views on fractures of the neck of the femur is more than justifiable. No routine method of treatment will fit all cases. The general practitioner must learn to differentiate the cases in which operation is indicated from those in which conservative treatment is sufficient. The most neglected point in the treatment of fractures of the neck of the femur in which bony union takes place is to allow the limb to assume an adducted position. Union in this position gives rise to an anatomical result which greatly impairs function, a point which I mentioned in the beginning of this discussion. For this reason the suggestion of Whitman should always be followed—forced abduction, whether the limb be fixed in plaster or the fracture treated by extension.

In Fig. 17 Ware[1] illustrates a good method of fixing the limb of a young child in abduction. It will be observed that the principles of the Middeldorpf[2] triangle are employed. If the fracture is unilateral the unaffected limb need not be included. This is the method advocated by Ware,[3] who credits Dr. W. W. Van Arsdale with its introduction.

Coxa Vara. This subject, which was introduced in 1899 and last mentioned in 1902 with the discussion of Hoffa's communication, has not lost its interest. Recent communications, however, have added nothing particularly new to our knowledge. Freiberg's[4] communication on coxa vara and osteoarthritis deformans is of interest in confirming Maydl's observations, which were the first made. Freiberg's *x*-ray pictures are unusually good. We must bear in mind the difficulty in some cases of differentiating coxa vara in the young adult from arthritis deformans of the hip-joint. I will discuss this subject again in the section on joint surgery. Hoffa[5] reports some interesting cases of congenital coxa vara which were first observed by Kredel[6] in 1896. The lesion is usually bilateral or may be associated with a congenitally dislocated hip on the other side. Blecher[7] reports some interesting cases of coxa vara in young adults between twenty and twenty-two, agreeing in every respect with Hoffa's views. Siebs[8] reports similar cases. The most recent discussion from an etiological and pathological standpoint, with illustrations, is given by Schlesinger.[9] He concludes that at the present time there is no evidence to allow the deduction that the femoral neck in these cases is the seat of localized rickets or osteomalacia. This, of course, is but a simple confirmation of Müller's and Hofmeister's view. Senn's[10] summary of the differential diagnosis between coxa vara and other affections of the hip-joint, read before the Pan-American Medical Congress, presents a clear and concise description of the present views.

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[1] Annals of Surgery, August, 1905, p. 259.

[2] Progressive Medicine, December, 1902, p. 103.

[3] Annals of Surgery, August, 1905, vol. xlii. p. 257.

[4] American Journal of Orthopedic Surgery, July, 1905, vol. iii. p. 6.

[5] Centralbl. f. Chir., 1905, vol. xxxii. p. 677.

[6] Progressive Medicine, December, 1899, p. 250.

[7] Deutsche Zeitschrift f. Chir., 1905, vol. lxxvii. p. 302.

[8] Centralbl. f. Chir., 1905, vol. xxxii. p. 791.

[9] Archiv f. klin. Chir., 1905, vol. lxxv. p. 629.

[10] Journal of the American Medical Association, June 10, 1905, vol. xliv. p. 1821.

Coxa Valga. Max David,[1] of Berlin, in reporting the first observation of a case of congenital coxa valga, considers the literature up to date. His remarks in regard to coxa vara agree with the statements which I have just made, that is, the problems in the etiology, pathology, and treatment of this interesting disease first studied by Müller, Hofmeister, and Kocher are well established. The literature is large. On the other hand, the reverse is true of coxa valga. The literature is scanty; it begins with a communication of Albert,[2] since which time there have been a few isolated observations by Manz, Hofmeister, Lauenstein, Thiem and others. The patient was a child, aged five years, who on examination exhibited a bilateral deformity; abduction, outward rotation, and restricted adduction; there was also hyperextension at the knee-joint. The child was otherwise perfectly healthy. The peculiar wabbling gait with legs apart was observed by the parents from the moment the child began to walk. The treatment consisted in fixing both limbs in plaster in an overcorrected position—adduction and internal rotation—and in this plaster the child was allowed to walk. The result was a distinct improvement. Anatomically the *x*-ray shows a slight correction, functionally the child walks very well.

Coxa valga, or, better, collum valgum (Albert), is not a disease *per se*, like coxa vara, but is a change in the neck of the femur, rarely observed, in a number of conditions. When for any reason, due to paralysis, disease of the knee-joint, or amputation of the limb, the leg hangs and does not carry weight, this change in the neck of the femur has been observed by Albert and others in museum skeletons. It has been observed by Thiem after fractures in the neck of the femur. Lauenstein observed it in a case of rickets. Hoffa has observed this change of the neck in congenital dislocation of the hip.

Fractures of the Shaft of the Femur. On the whole these fractures are easy to recognize and to reduce. The best method of treatment is simple extension, with the thigh fixed in coaptation splints, a method illustrated in every text-book on fractures. In young children it is better to have the leg extended in the vertical position; in nursing babes plaster will have to be used. Under the operative treatment of simple fracture we have mentioned that a fracture in the upper third of the shaft of the femur may be associated with such a great dislocation of the upper fragment that an operation is indicated.

The more difficult fractures of the shaft to treat, and which can be recognized only with the *x*-ray, are the spiral or torsion fractures. In Progressive Medicine for December, 1903, p. 141, I discussed Dietzer's experience from Bardenheuer's clinic. Spiral fractures of this bone are less frequent than of the tibia, but by no means uncommon. They occur chiefly in children under ten years of age and usually involve the middle third, less commonly in young adults, when they are apt to be situated in the lower third; while in older people the few observed cases have been near the junction of the middle and upper third. In the most recent contribution on spiral fractures by Max von Brun,[1] from von Bruns' clinic, I find excellent x-ray studies of this fracture of the shaft of the femur. This gives me for the first time an opportunity to reproduce some of them, as they should be of great interest to the general practitioner, as well as to the surgeon. In this clinic one-sixth of all fractures of the femur were of the spiral variety (nineteen cases). The age agrees with Dietzer's observation: twelve patients were under ten years of age, the others scattered from ten to sixty.

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[1] Zeitschr. f. Orthoped. Chir., 1904, vol. xiii. p. 360.

[2] Progressive Medicine, December, 1899, p. 246.

It is interesting to note that two fractures among this number were compound; in both the conservative method of treatment was employed with excellent results. In one case the external wound, due to a sharp fragment of bone, was so small that the wound was simply covered with an aseptic dressing. In the second case, in which the leg was caught between the hub of a wagon and a curbstone, there was a large wound above the knee on the inner side. Undoubtedly in this case the crushing force had more to do with the laceration of the soft parts than a fragment of bone. The physician, who saw the patient at once, stated that there was a serious hemorrhage and ligated the two ends of a large artery torn across. When the patient was admitted to the clinic the ligated vessels could be seen in the wound, and the patient showed evidence of great loss of blood. Nothing was done but simple disinfection of the wound and iodoformized gauze tampon. There was no disturbance of healing and no signs of infection, except a thrombosis of the femoral vein, which was observed on the thirty-third day, but which did not complicate the healing of the fracture.

In studying these nineteen cases critically I was anxious to ascertain if in any of the cases better results could have been obtained by immediate operation. In this group of cases in von Bruns' clinic the treatment employed was simple extension, with some method of fixation of the thigh, usually Volkmann's splint, the principles of which are similar to the coaptation splints which I have recommended. As a rule, after from fourteen to twenty-four days, the consolidation is sufficiently firm to allow the patients to be placed in a plaster cast and leave the clinic on crutches. In four cases there was no shortening; in the remaining cases the shortening varied from ½ to 3 cm. The worst result was then less than an inch and a half shortening. In children, however, 2 cm., almost an inch, should be considered a sufficient amount of shortening to desire a better method. Dietzer admits also an average amount of shortening of 2 cm. As his cases were treated in Bardenheuer's clinic, where the extension method may be considered to have reached its best development, we may conclude that these results are as good as can be obtained by extension. For this reason I would suggest that it would be advisable to explain to the patient or the family that after the non-operative treatment in these cases a certain amount of shortening usually results.

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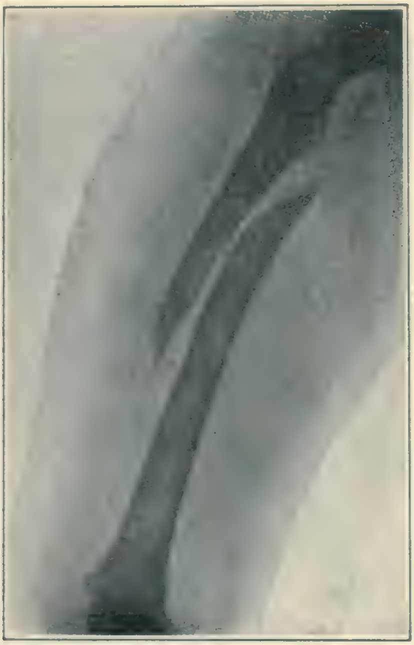
[1] Beiträge zur klin. Chir., 1904, vol. xliv. p. 655.

Fig. 18

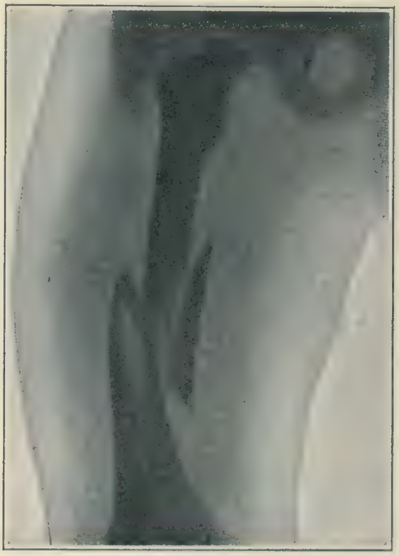


Theoretically, an operation in the recent state would undoubtedly allow a better correction of the overlapping which is so difficult to overcome by the extension method. Unfortunately neither my own experience nor that in the literature gives a sufficient number of cases to allow a comparison. In addition the depth of the shaft of the femur and the frequent proximity of the fragments to Hunter's canal makes an operation theoretically more serious than upon fractures on other bones or in the lower and upper third of the femur.

Fig. 18 is a good illustration of a fracture difficult to treat by extension. In this case, in a child of seven years, the shortening at the end of two and a half weeks was 3 cm.; at this time the bone was refractured and an attempt made to lessen the shortening, but the patient left the clinic in plaster without further measurements, so there is no record. In this case the extreme overlapping of the fragments is beautiully shown in the *x*-ray. A second *x*-ray, after extension, if it had been made, would have at once indicated the faulty position. I believe that an operation in this case would have given a better result.

Fig. 19 is of great interest, because the line of fracture and the three fragments correspond to an observation of my own on the humerus.[1] This patient was a child aged four years; the limb was broken by a direct force, associated with torsion. It was treated with simple extension, and a perfect result obtained; solid healing in three weeks. In my observation on the humerus I found, after placing the arm in full extension and fixing it in the usual way to the side of the body, that the fragments which were considerably separated[2] remained unchanged.[3] For this reason I exposed the fracture by open incision; on account of the deep position of the humerus and the proximity of the musculospiral nerve wiring would have been difficult. In manipulating the arm I found to my surprise that when the arm was placed in extreme abduction (away from the body) the three fragments at once came in perfect position. When the arm was placed against the side of the body the fragments again separated. For this reason I put in but a single wire, which by itself would not have

FIG. 19



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[1] PROGRESSIVE MEDICINE, December, 1903, Figs. 1 and 2, Plate I. p. 142.

[2] Loc. cit., Fig. 1.

[3] Loc. cit., Fig. 2.

held the fragments together, and fixed the fracture on the Middeldorpf triangular splint.[1] There was solid union in three weeks, without deformity and without shortening. The point that I wish to emphasize about these spiral fractures is that even if there be comminution solid union takes place quickly; the chief difficulty is to overcome the overlapping. Our experience will not allow us to select from the first *x*-ray examination the cases which are better treated by open incision. After the fracture has been reduced and a proper extension treatment applied, a second *x*-ray examination will inform us whether adaptation of the fragments is sufficiently good to justify a continuation of the extension treatment. Otherwise operation is indicated.

FIG. 20

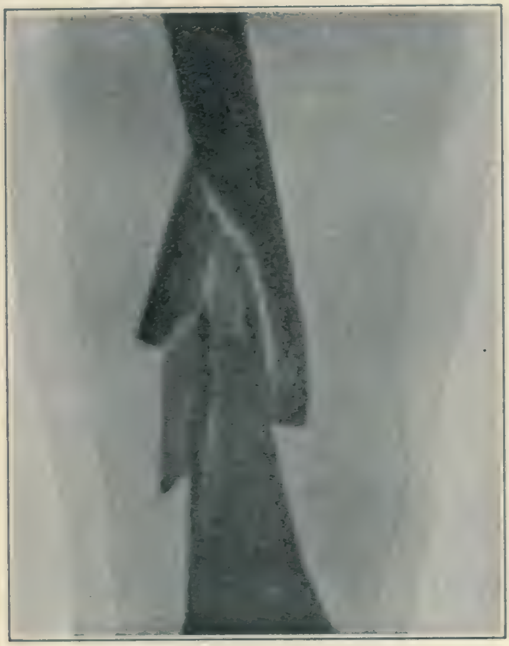

Fig. 20 demonstrates the extreme degree of a torsion fracture with comminution. This is one of the compound fractures previously discussed, in which the limb was crushed and a large artery torn. This case was also treated by simple extension, with a resultant shortening of only 3 cm., which must be considered, from the nature of the fracture, a good result. It impresses me that if this had been a simple fracture one would not have hesitated to operate, but in view of the large wound it was a wiser plan not to interfere.

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[1] PROGRESSIVE MEDICINE, December, 1902, p. 103.

FRACTURES OF THE LOWER END OF THE FEMUR. I can find little in recent literature on this subject. As a rule, the fragment or fragments can easily be reduced and kept in place. Fixation in plaster in a slightly flexed position usually is the best method of treatment. The bandage should be changed frequently for massage and passive motion. Separation of the lower epiphysis of the femur is not uncommon. In a recent communication by Kirmisson,[1] which was discussed before the French Surgical Congress in 1904, the subject of epiphyseal separation was brought up to date since Poland's monograph in 1898, when he collected 700 cases. Traumatic separation of the epiphysis is most common in the lower end of the femur and radius and the upper end of the humerus, chiefly observed between the ages of twelve to fifteen years, and now and then up to twenty-five years, very rarely under twelve years of age. The injury is usually produced by torsion from indirect force. Operative correction is frequently indicated because of the impossibility of reducing the epiphyseal fragment. As a rule, this difficulty is met with most commonly in the lower epiphysis of the femur. Contrary to previous views, impaired growth is not observed in the majority of cases. The cartilage usually remains attached to the diaphysis.

Summa[2] reports an observation in which the lower epiphyseal fragment was completely dislocated forward. Summa's patient, a boy aged seventeen years, sustained this fracture by direct force. The clinical picture was almost enough to make a diagnosis. The knee was overextended, the tubercle of the tibia very prominent, there was greatly increased lateral motion of the knee-joint, but no crepitus. The knee could be overextended at will; reduction under ether was found to be impossible. The fracture was then reduced by an incision into the knee-joint and direct pressure on the epiphyseal fragment. The result has been practically a perfect one. Summa quotes three other cases from the literature, which by no means cover all the reported cases.

The only case observed in Dr. Halsted's clinic was operated on by Finney. He found that reduction of the lower fragment was accomplished after open incision, by overextension, then traction with flexion.

FRACTURES OF THE PATELLA. Thiem's[3] contribution, read before the Thirty-fourth German Surgical Congress in April, 1905, presents this subject not only historically, but with the present day's views. The discussion which followed the reading of this paper[4] demonstrates that the consensus of German opinion agrees with that in this country, that the best results are obtained by open incision and suture in the recent state. Even in the older cases with separation of the fragments the function of the limb can be very much improved by suture. In cases in which there is such wide separation that a plastic operation has to be performed on the rectus muscle to bring the fragments together, the results obtained in the majority of cases justify the procedure. The general practitioner, therefore, should inform his patient, with a recent fracture of the patella, that the probabilites of union with function after non-operative treatment is very slight, and the results of the operation in the later period are not as good as those in the recent state. If it is impossible to place your patient in the proper surgical environment for operation, put no faith in any special apparatus or plaster dressing. Place the limb extended on an inclined plain, flexed at the hip, have the knee and quadriceps muscles massaged daily, let the fragments take care of themselves. The best functional results are gotten by this method of treatment. This is the proper preliminary treatment during the first six or ten days before operation. It is practically impossible to prognosticate the result of non-operative treatment. Good results have been accomplished, but there is no question that if the operation can be performed properly best results are obtained. At the operation, in the recent state, the bone should not be sawed, suture of the ligament is sufficient, although there is no objection to bone suture. In every case, if the lateral portion of the quadriceps tendon on each side of the patella is torn, it should be sutured. In these cases begin massage on the tenth day after the operation, slight passive motion in the second week, considerable passive motion in the fourth week; get your patient out in the fifth week. With the proper suture bony union seldom fails, and with this early massage and passive motion the function of the joint is rapidly restored. In older cases, in which the fragments are separated by fibrous tissue, a thin zone of bone must be removed with the saw from each fragment, bone suture is required; in addition, always suture the ligament to each side of the patella. When the fragments are widely separated they can be brought together by lengthening the quadriceps with a plastic operation, the details of which I will consider next year, with the report of cases. My own illustrations are not yet prepared, and I can find none in the literature. My last result of a case of this character was bony union with flexion of the knee-joint, possible to a right angle, a practically perfect result, especially as the opposite patella, which was less separated, was also sutured with perfect joint function.

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[1] Revue d'orthop., 1904, No. 6.

[2] Deutsche Zeitschr. f. Chir., 1904, vol. lxxii. p. 321.

[3] Archiv f. klin. Chir., 1905, vol. lxxvii. p. 730.

[4] Centralbl. f. Chir., 1905, vol. xxxii., No. 30, Supplement, p. 114.

FRACTURES OF THE BEAK-SHAPED PROCESS OF THE TIBIA. My attention was called to this fracture in 1903 by Schlatter's communication.[1] Since then Winslow[2] has reported a case with beautiful x-ray studies, which he was good enough to write me about. Ware[1] also reports a case with good *x*-rays. Cassidy,[2] of Baltimore, has observed two cases which I had the opportunity to see clinically. This lesion is also considered by Osgood,[3] of Boston. These communications confirm the statements of Schlatter and the remarks made in PROGRESSIVE MEDICINE, December, 1903. In my remarks on Dr. Cassidy's paper I called attention to the fact that Winslow's patient was the only one on whom an operation was performed, and comparatively in this case the patient made a more rapid recovery. Ware's case is of interest, because the patient came under observation six hours after the trauma, and with proper treatment fixation of the knee was saved from the late discomforts, observed in all these cases not treated in the recent state. Winslow's and one of Cassidy's cases were bilateral lesions. Fig. 21 illustrates the clinical picture. The enlargement of the right tubercle is most pronounced, and it was this one which gave the patient the greatest discomfort and in which the *x*-ray showed the most marked lesion.

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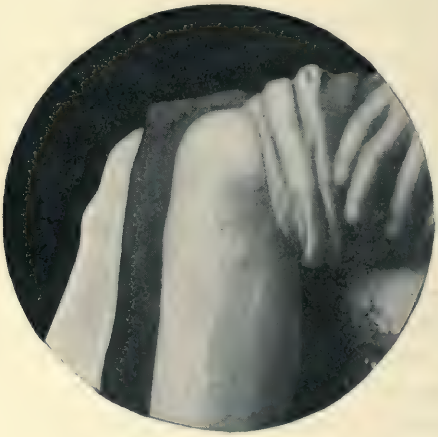
[1] PROGRESSIVE MEDICINE, December, 1903, p. 145.

[2] Annals of Surgery, February, 1905, vol. xli. p. 278.

FIG. 21



A case reported by Wollenberg[4] demonstrates that the treatment in the recent state does not always ensure the patient from future trouble. When this patient was seventeen years of age (the age of ossification of the beak-shaped process is from eighteen to twenty years), while about to jump with the knees in flexion, he felt a severe pain in the left knee. Examination demonstrated that the patella was higher, the *x*-ray showed a fracture of this beak-shaped process. The leg was treated in extension, with adhesive straps pulling down the patella, and massage, with an apparently good result. Six years later, however, he had a recurrence of pain. The *x*-ray showed that the fragment was still separated by fibrous tissue, and appeared to be much enlarged by bone growth. I am inclined to think that in the recent state fixation and extension should be maintained at least six weeks. In the cases observed later the excellent and quick result in Winslow's case suggests that operative intervention with removal of the new-growth of bone will give the best results.

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[1] Annals of Surgery, November, 1904, vol. xl. p. 739.

[2] Maryland Medical Journal, August, 1905.

[3] Boston Medical and Surgical Journal, January 3, 1903, vol. cxlviii. p. 114.

[4] Deutsche med. Wochenschr., 1904, No. 43; Centralbl. f. Chir., 1905, vol. xxxii. p. 157.

PROGNOSIS IN FRACTURES OF THE LEG. One interested in accident insurance and the duration of disability after a fracture of one or both bones of the leg will find the subject considered in the most minute details with large statistics by Sauer.[1] I must confess that I was much surprised to find that full ability to work is noted in over 75 per cent. of the cases only after an average of 16.4 months.

Of those cases who have not acquired complete ability to work within fourteen weeks after the accident, in 70 per cent. the average partial disability lasts 22.4 months. Age is a most imporant factor. All of the cases up to twenty years get complete function between twenty and thirty, five-sixths; between thirty and fifty, two-thirds to one-half; over fifty, only one-third. I cannot discuss this article in detail, but these statements are startling. In a large surgical clinic we seldom follow our fracture cases treated in the ward after they leave the hospital. In my own experience with cases which I have treated in my private practice I have never observed such a long disability. There is a very significant remark in Sauer's communication. He states that the disability is due to atrophy of muscle and restricted joint function, and then remarks that this occurs in spite of massage and passive motion. In my own observation, if the fracture is frequently dressed, the leg given proper and frequent masage and the joints passive motion, joint function and muscle tone are almost as good when bony union is accomplished as before the fracture took place. In the public-ward service it is practically impossible to have this treatment carried out. This monograph of Sauer emphasizes that fractures are lesions which, even though properly treated, may incapacitate the individual for months from the pursuit of his usual occupation, especially if he belongs to the laboring classes. It is a subject which should be discussed between the hospital trustees and the medical staff to see if appropriation cannot be obtained to give these patients proper massage and exercise.

SPIRAL FRACTURES OF THE TIBIA AND FIBULA. Since my review, with illustrations, of Lauenstein's and Zuppinger's communications on this subject, I find two very extensive, almost monographic, contributions, one by Bayer,[1] from the surgical clinic of Bardenheuer, in Cologne, and the second one, more recent, by Max von Bruns.[2] The part of this second article, which deals with spiral fractures of the femur, I have discussed with illustrations. The chief part of both of these publications consists of numerous *x*-ray studies and detailed cases of spiral fractures of the tibia and fibula. However, the illustrations produced in PROGRESSIVE MEDICINE for December, 1903, need no additions. As von Bruns remarks, his contribution, from the large experience of the Tübingen clinic, confirms the views of Dietzer, Zuppinger, Lauenstein, and Bayer. The important factor to emphasize is that modern *x*-ray studies have confirmed the statement of von Bruns', in 1884, that spiral fractures are by no means uncommon. The importance of this fracture to the general practitioner is that it is more difficult to completely reduce and to accomplish union without shortening or deformity, and the question naturally arises, When is operative intervention indicated? At the present time our experience is not sufficient to select the cases at the first *x*-ray examination, but only at the second, after the reduction for operation. I thought perhaps Sauer,[3] in his study of the ultimate results of fractures of the bones of the leg, would throw some light on the subject, but he does not. He compares, as carefully as he can, the results of treatment with fixation of splints and Bardenheuer's extension. He comes to the conclusion that in some cases the extension treatment gives the better results. For two or three years I have been considering the advisability of discussing, with illustrations, Bardenheuer's extension treatment of fractures.[4] It impressed me as complicated and as impossible for general use outside of a hospital ward. Sauer states that it needs constant supervision, and in many cases they returned to splint dressings. As I have not used this method in fractures of the leg, I am not yet prepared to discuss it. The important conclusion for the general practitioner is, that in surgical clinics with large experience the results in fractures of the leg are by no means as good as desired. But as yet it has not been demonstrated that operation in the recent state in selected cases will improve these results. At the present time I should advise careful reduction under narcosis, fixation of the leg in a light splint, frequent dressings with massage and passive motion, plaster dressing at about the third week; this dressing should be changed at least once a week, with massage and passive motion. The *x*-ray, if possible, should be used if not before, at least after, the attempt at reduction under narcosis. If the approximation of the fragments is not good the case should be referred to expert surgical advice.

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[1] Beiträge zur klin. Chir., 1905, vol. xlvi. p. 184.

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[1] Deutsche Zeitschr. f. Chir., 1903, vol. lxix. p. **524.**

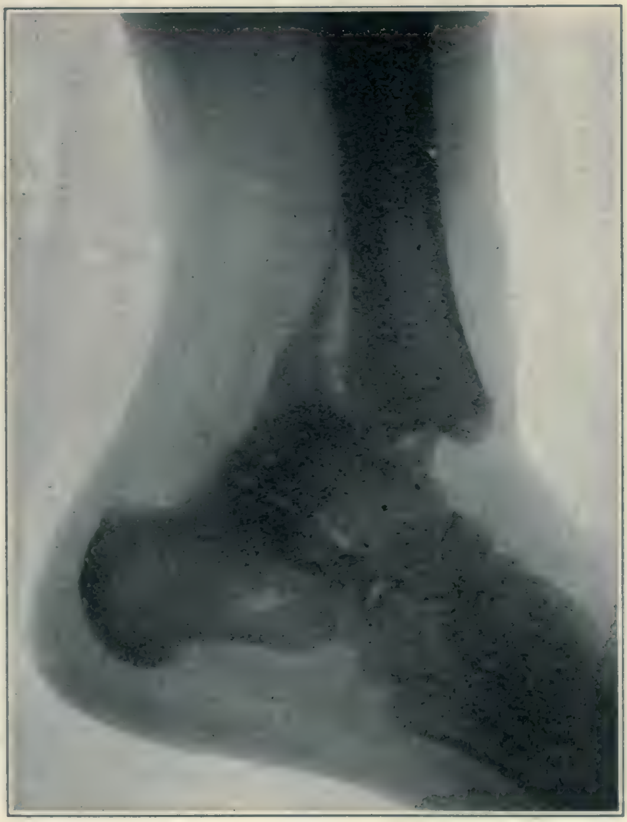
[2] Loc. cit.

[3] Loc. cit.

[4] Zeitschr. f. Orthop. Chir., vol. xii. p. 107.

Fragmentation of the Distal End of the Anterior Edge of the Tibia. Sachs,[1] in reporting with illustrations this rare fracture near the ankle-joint, collects five other cases from the literature. As in some of the cases a second operation was necessary to chisel off the projecting border of the dislocated fragment, I am inclined to the view that it is a fracture in which operation in the recent state may give better results.

Fig. 22



In a recent observation of my own, in which there was a typical Pott's fracture, the x-ray demonstrated a fragmentation of the tibia. This fragment did not move forward with the dislocated tibia. As perfect reduction was accomplished under narcosis and confirmed by the x-ray, an operation was not performed. The ultimate result has been a perfect one. Fig. 22 is a lateral view before reduction, and Fig. 23 after reduction.

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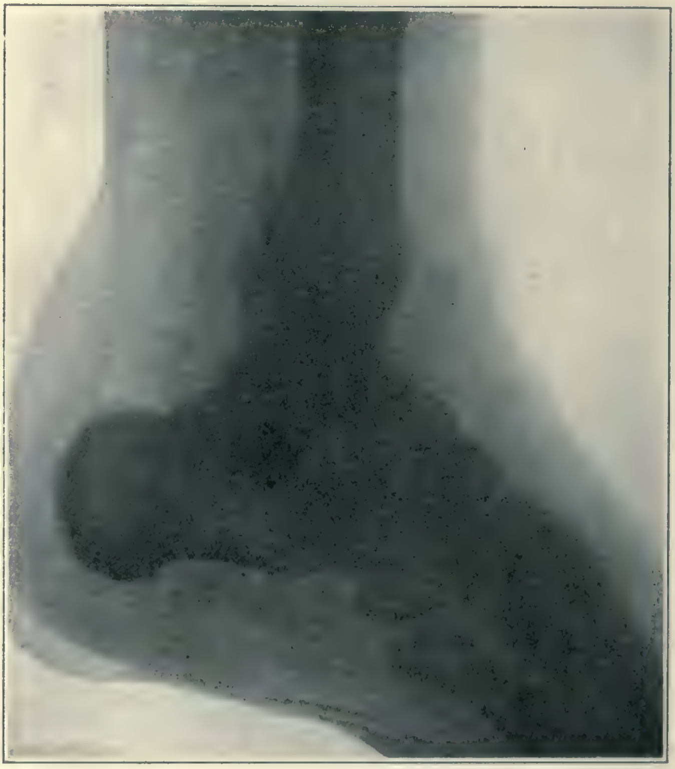
[1] Deutsche Zeitschr. f. Chir., 1904, vol. lxxv. p. 365

FRACTURES OF THE HUMERUS AND ITS RELATION TO RADIAL NERVE PARALYSIS. A glance at any anatomy will find an illustration of the relation of this nerve to the shaft of the humerus. The most recent and complete study of this subject has been presented by Fessler,[1] of Munich. Fig. 24 shows how the radial nerve was caught and overextended by one of the fragments in a fracture of the shaft of the humerus. Nerve injury associated with a fracture is a very distressing complication. Fortunately, it is rather infrequent; perhaps the injury of the radial nerve in fracture of the humerus is the most common; that of the ulnar nerve in fracture of the lower end of the humerus next. The most extensive involvement of nerves associated with a fracture is observed in a certain number of cases in fractures of the clavicle in which the depressed fragment or the callus involves the brachial plexus. Fessler

FIG. 23



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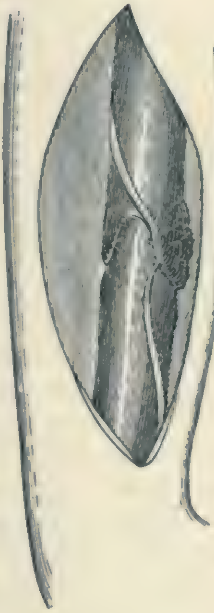
[1] Deutsche Zeitschr. f. Chir., 1905, vol. lxxviii. p. 60.

recognizes three forms: the primary, in which the paralysis comes on at once, due to contusion or tearing of the nerve; secondary, in which the paralysis is observed weeks or months after the fracture and may be due to various causes—in simple fracture to callus formation, in compound fracture to the secondary inflammatory process of bone or soft parts. In addition he recognizes a third form which he calls intermediate. In this group the nerve is injured not at the time of the fracture, but hours or days later, due to overstretching over the dislocated fragment or its injury in the healing process. This group, apparently, is the most common—34 cases. Of the primary type he was able to collect 18, of the secondary 12 cases, while in 15 instances the paralysis could not be classified. If a careful examination is not made at the time of the accident a nerve injury can easily be overlooked. It should be the routine practice in every case of fracture to make a careful examination as to sensation and muscle function. The practical question is what is the best course to pursue when there is evidence of loss of function of a nerve in the neighborhood of the fracture, especially if it is a motor nerve. There is some difference of opinion in regard to the time of operation. If it is a simple fracture and the paralysis is primary one can wait a few weeks. In the meantime the fracture should be completely reduced and kept in extension. If the paralysis is due to simple contusion or overstretching and the continuity of the nerve is not destroyed recovery will take place without operation. If function, however, has not returned after a few weeks the nerve should be explored and isolated; if torn, sutured. In compound fracture, where there is an open wound and the wound is a small one, the treatment should be the same as in the simple fracture. If the wound is a large one, not infected and seen early, the attempt should be made to find, isolate, or suture the injured nerve at the primary operation. However, if the wound is infected, one should pack and wait until the inflammatory process has subsided. It is impossible to distinguish clinically whether the nerve is injured by compression or separation of its continuity. For this reason, in all cases, the sooner the operation is done, after waiting a short interval, the better. The results are uniformly good. It is sometimes very difficult, in older cases, to isolate the nerve from the scar tissue or callus. If the nerve is destroyed for some

FIG. 24



distance it is justifiable to resect the humerus sufficiently to bring the ends of the nerve together without tension.

In a case of spiral fracture of the humerus[1] I found on exploring the fracture in the recent state that the radial nerve was so near the fragments that "in order to prevent this nerve from being caught in the subsequent callus the triceps muscle was separated, the nerve pushed into this groove and held in place with catgut sutures." Paralysis did not develop. This procedure might be a good one in all operations. In this way the nerve lies in a bed of muscle and cannot be involved in the subsequent inflammatory process of healing. My second observation was on a gunshot wound of the arm in a child of five. The shot tore a hole through the arm, removing a piece of bone and soft parts. At the primary examination there was evidence of paralysis of the musculospiral nerve. In view of the extensive injury it was considered best to pack the wound. The operation was performed ten days later. The two ends of the nerve were found with some difficulty. The separation was about 4 cm. As a piece of the shaft had been carried away by the shot resection was not necessary to bring the ends of the nerve together. After the suture the nerve was embedded in the triceps muscle, as in the previous case. This patient left the hospital five months after operation. At this time there was distinct evidence of nerve regeneration. The bone had united firmly and the child had perfect use of the shortened arm, except the muscles, which produced extension of the wrist and fingers. At the present time (September, 1905, one year later) there is good result.

Pathological Fractures. Grunert's[2] contribution to this subject is probably the most complete since von Bruns' article in 1886. It is written from the surgical clinic of Habs in Magdeburg. Dr. Grunert is a military surgeon assigned to this clinic.

He refers to two previous monographs on this subject, by Gurlt[3] and von Bruns,[4] and considers the etiology of pathological fractures under the following headings:

I. Fractures associated with local lesions of bone.
  A. Tumors.
    a. Primary and metastatic sarcoma.
    b. Metastatic carcinoma.
    c. Adenocarcinoma from the thyroid.
    d. Solid enchondroma and benign bone cysts.
    e. Echinococcus cysts.

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[1] PROGRESSIVE MEDICINE, December, 1903, p. 122.

[2] Deutsche Zeitschr. f. Chir., 1905, vol. lxxvi. p. 254.

[3] Handbuch der Lehre von den Knochenbrüchen, 1862.

[4] Die Lehre von den Knochenbrüchen, 27 Lieferung der Deutschen Chir., 1886.

- *B*. Inflammatory processes.
    - *a*. Pyogenic osteomyelitis.
    - *b*. Tuberculous osteomyelitis.
    - *c*. Aneurysms.
    - *d*. Syphilis.
- II. Fractures associated with general diseases.
    - *A*. Neuropathies.
        - *a*. Tabes dorsalis.
        - *b*. Syringomyelia.
        - *c*. Mental diseases.
    - *B*. Senile.
    - *C*. Exhausting chronic diseases.
    - *D*. Atrophy due to non-use.
    - *E*. Scurvy.
    - *F*. Rachitis and osteomalacia.
- III. Idiopathic friability of bone (osteoporosis, fragilitas ossium).

Under all of these subjects he gives the recent literature since von Bruns' work, that is, the literature from 1886 to 1904.

Grunert correctly prefers the term "pathologic" to "spontaneous" fracture. Pathological fractures may be due to local changes associated with bone destruction, in which the etiological factor is present in the bone at the site of fracture—*e. g.*, tumors and inflammations; or, the changes may be associated with general diseases.

I. FRACTURES ASSOCIATED WITH LOCAL LESIONS OF THE BONE. *A*. *Tumors*. The most common is the primary sarcoma. Pathological fracture associated with metastatic sarcoma is rare. He has been able to find but two cases in the literature—Dalzell, a fracture of the femur due to a metastatic nodule from a sarcoma of the diaphragm; in this case there were also metastatic foci in the skull,[1] and Le Grand, who reports a fracture of the humerus in which the primary tumor was situated in the sciatic notch of the iliac bone.[2] Unfortunately, he does not give any details of these two cases, and it will be interesting to look up the original to find out the character of the tumor. (Sarcoma rarely metastasizes to bone, no matter what its primary seat. This, of course, may be due to the fact that metastatic sarcoma kills quickly and there may not be time enough for foci in the medullary cavity to grow sufficiently to produce a fracture.)

In primary sarcoma the pathological fracture may be the first symptom. After the fracture union very seldom takes place. Gurlt recorded no instances, von Bruns found four cases in the literature, Grunert was able to collect 3 more cases, so there are 7 cases of pathological fractures due to primary sarcoma in which union took place after the fracture; 1 case is reported by Verneuil in which the patient lived one year after the first pathological fracture; there was union and shortly before death a second fracture in the same position. Despres[1] records 2 cases, a fracture of the femur, primary sarcoma in sacrum, there was union and the patient lived a year; in the second case, also of the femur, after union there was a second pathological fracture; in both of these cases the autopsy confirmed the diagnosis.

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[1] Glasgow Medical Journal, April, 1887, vol. xxvii. 4, p. 298.

[2] Bull. de la Soc. anat., July, 1889, S. iii., 20, p. 470.

Grunert was unable to find any recorded cases of union after a pathological fracture due to a metastatic carcinoma.

He mentions the possibility of a general friability of bone in patients suffering with cancer cachexia. Such a pathological fracture, according to Grunert, must be considered due to a general disease, which has been called osteomalacia carcinomatosa. Von Bruns records 3 cases, Grunert finds 1 reported by Ritchie. This case is of great interest. The patient was a female, aged forty-seven years. In 1885 a complete operation was performed on one of her breasts for a scirrhus carcinoma. In 1892, six years and eight months later, the patient complained of pain in the back and limbs. These continued off and on, and by 1894, in two years, there were definite changes on the pelvis and thorax characteristic of osteomalacia. At the autopsy a pathological fracture of the fourth rib was found. The rib showed the characteristic changes of osteomalacia, but it is very important to note that cancer cells were found in the soft medullary tissue of the rib. Grunert makes no mention of autopsies in the cases reported by von Bruns, but in this case of Ritchie the osteomalacic changes were associated with and, perhaps, due to the presence of metastatic cancer cells in the medullary cavity. In the study of the ultimate results of the cases of cancer of the breast, in the Johns Hopkins Hospital Surgical Clinic, persistent vague pains in the spine and limbs have quite frequently been the first symptoms of a late regionary recurrence. I am quite convinced that general medullary bone metastases which do not produce a pathological fracture are quite frequently present in cases suffering with metastatic carcinoma, and they can easily explain the discomforts and sometimes the intense pain referred to one or more different bones.

Grunert refers to the fact that pathological fractures are usually observed with the primary medullary sarcoma. Of the collected cases the fracture was situated in the femur in 56 per cent., in the humerus in 21 per cent., in the tibia in 14 per cent. Of metastatic carcinoma the majority of recorded cases of fracture have been associated with primary carcinoma of the breast (60 per cent.), and of all metastatic carcinoma fractures over 50 per cent. have been observed in the femur. I do not think these figures demonstrate that the femur is necessarily the bone most frequently attacked, but on account of its weight-bearing function and its anatomy a focus, especially near the neck, where the pathological fracture is most common, will more easily and quickly produce bone destruction. Grunert was able to find but 1 case of pathological fracture of the humerus due to a metastatic carcinoma; von Bruns found no cases. We have observed 1 among our cancer of the breast cases, while at the same time we have had at least 6 in the femur. In recent literature Grunert found two pathological fractures of the ribs, one metastatic from carcinoma of the œsophagus, and the other from the breast—Ritchie's case, already mentioned.

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[1] Quoted by Picque

Bone Metastasis from Thyroid Tumors. This is an unusually interesting condition. Grunert's literature is pretty complete. He mentions 1 interesting case reported by Middeldorpf. The patient was a female, aged fifty-six years; for a year and a half she has had a tumor in the left pelvis in the sacroiliac region and one in the back of the head; as they were soft and boggy a clinical diagnosis of tuberculosis was made; at the exploratory incision the tumor tissue was so vascular that no attempt was made at excision; microscopically the tumor was composed of tissue resembling a colloid adenoma of the thyroid, and at a more careful examination a pigeon-egg-sized tumor was discovered in one of the lobes of the thyroid; later this patient developed pathological fractures in both humeri, and it is interesting to note that both of the fractures healed. The patient lived a year and a half after operation. The duration of life from the onset of the metastatic tumor in the pelvis was three years. Apparently this is the only form of pathological fracture due to a metastatic epithelial tumor in which bony union has been observed.

In this connection Grunert discussed the relation between the thyroid and the osseous system. Von Eiselsberg, now Professor of Surgery in Vienna, in 1893 recorded 8 cases of bone metastasis from thyroid tumors; von Recklinghausen, in an autopsy on a case of exophthalmic goitre, observed definite softening of all the bones, but no fractures. No bone changes have been observed in myxœdema. Hofmeister, in a series of animal experiments, demonstrated great interference with the growth of bone in thyroidectomied young animals, while Steinlin demonstrated on animals that a fracture would not heal if the thyroid had been completely removed, while Pascal found that thyroid extract aided bony union in cases of delayed union after traumatic fracture.

Pathological Fractures with Benign Bone Tumors. Grunert mentions the rare cases of pathological fracture with solid enchondroma. Gross recorded 5 cases.[1] In recent literature Grunert has been unable to find any other cases. However, in the benign bone cysts, which have previously been discussed in full in PROGRESSIVE MEDICINE, a pathological fracture is quite common. Von Bruns recorded 4 cases, and Grunert has been able to add 8 recent observations. Of these 12 benign bone cysts with pathological fractures 10 were situated in the femur, 1 in the tibia, and 1 in the humerus. Grunert does not mention the cases which I have reported with pathological fracture—1 in the humerus and 1 in the femur.

Ziegler mentions the possibility of cysts in arthritis deformans, but no cases of pathological fracture have been observed. I have observed a small cyst in the great trochanter of the femur associated with what might be called ostitis deformans, but in this and Ziegler's cases the shell of bone about the cyst is not only abnormally thick, but hard, and one would not expect a fracture. In the benign bone cysts supposed to be due to the degeneration of a solid enchondroma the shell of bone is thin and friable.

Echinococcus Cysts in Bone are rare. Of all reported cases in only 3.5 per cent. have cysts been observed in the bone. Gurlt in 1862 records 4 cases of pathological fracture. In the next thirty-seven years, up to 1899, Schuchardt, in the *Deutsche Chirurgie*, was able to collect 14 more cases. In the last five years Grunert has been unable to find any further recorded cases. On account of their rarity and interest it is quite probable that such cases would have been recorded if observed.

B. Fractures Associated with Inflammatory Processes. a. Pyogenic or Infectious Osteomyelitis. Considering the frequency of this bone lesion pathological fractures are unusually rare, due undoubtedly to the fact that in the acute stage the patient is confined to bed and very quickly, after the onset of the inflammation in the bone-marrow, an ossifying periostitis begins so that by the time a sequestrum has formed, there is a new shell of periosteal bone (the involucrum). Very little has appeared in recent literature since von Bruns' article in 1886. Mauny's report is of interest on account of the rare locality. The patient with an osteomyelitis of the iliac bone died of septicæmia, and at the autopsy a fracture of the acetabulum was demonstrated.

In Habs' surgical clinic in the last ten years there have been 77 cases of osteomyelitis without a fracture.

In the so-called osteoperiostitis albuminosa pathological fractures are also very rare. Poncet records a case in a male, aged forty-five years. This patient from fifteen to twenty-five years of age had recurrent attacks of osteomyelitis, which left him, however, with a leg in good function. He was apparently well from twenty-five to fifty-one years of age, when he began to have pain in the old bone lesion, which confined him to bed for a number of days. In getting out of bed and attempting to walk he fell and observed very quickly a swelling of the thigh. This was incised and a slightly hemorrhagic-serous fluid was found which had dissected the periosteum from the shaft of the femur, and a fracture was found. From the wound for some days there was a copious discharge of serum, but it healed slowly with much callus formation, and there was firm union in four months.

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[1] Quoted by v. Bruns.

b. *Tuberculous Osteomyelitis.* Pathological fracture in this bone lesion is less frequent than in pyogenic osteomyelitis. Von Bruns finds that they are more common in the short pipe bones and the ribs than in the long pipe bones. In recent literature Grunert was able to find two pathological fractures of the vertebræ, one of the femur through the epiphyseal line and one of the lower jaw demonstrated at autopsy. The latter case was that of a child about two years of age who had multiple tuberculous bone lesions. At the autopsy there was a swelling about the chin due to a collection of pus. This arose from the symphysis of the lower jaw, which was separated. Separation of the epiphysis in pyogenic osteomyelitis is not especially uncommon.[1]

c. *Aneurysm.* Pathological fractures associated with this lesion are due, of course, to the erosion or atrophy of bone due to pressure of the aneurysm sac. They are rare. Cases are recorded in the sternum, ribs and vertebræ. Grunert finds one example of each in the literature. One in a patient, a male, aged thirty-five years, with a history of syphilis, developed a fracture of the thoracic vertebra with paralysis. The autopsy demonstrated an aortic aneurysm opposite the fractured vertebra. In a second patient, a male, aged forty-five years, there were signs of aortic aneurysm for three years. One year before death he complained of intense pain in the chest to the left of the sternum, and there developed in this area a pulsating tumor. At the autopsy in the position of the extrathoracic aneurysmal sac there was found a fracture of the third rib near the sternum.

d. *Syphilis.* Pathological fractures are relatively rare. The most complete monograph was written in 1884 by Gangolphe. He collected 52 fractures in 39 patients. It is interesting to note that the humerus was the most common seat, yet gumma and periostitis of the humerus are by no means the most common situation. The seat of fracture was as follows: humerus, 18; femur, 12; clavicle, 12; radius, 5; rib, 2; tibia, 1; patella, 1. In recent cases Grunert found: clavicle, 3; tibia, 3; humerus, 4; 1 of the shaft, and 1 of the neck of the femur. Probably the most common situation of syphilitic gumma or periostitis is the rib, yet recorded cases of pathological fracture are very rare. This is true also of the tibia. The clavicle is a very common bone for a syphilitic periosteal lesion and apparently pathological fractures are common in this bone. Grunert observed a fracture of the left femur in a male, aged thirty-eight years; the fracture followed a slight trauma while the man was bowling. At the time of the injury there were no signs of tabes, but four years later the patient showed the clinical picture of tabes dorsalis.

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[1] PROGRESSIVE MEDICINE, December, 1899, p. 226.

This brings up the question of what is the etiological factor of the pathological fracture in lues, whether it is a local lesion due to a gummatous osteomyelitis or a general change in the osseous system. Picque and others advocate the local theory, but they admit that in some cases there are no definite local changes. Charpy has demonstrated that general friability of bone is due to a decrease in lime salts. Grunert calls attention to the fact that the pathological fractures in lues are observed in the very late stages of syphilis, in that period of the disease when gummata are rare, that the age of the patient is usually over forty, that in some of the cases with pathological fracture symptoms of tabes develop. In this latter group of cases fracture is associated with little or no pain; for example, Helferich observed in a patient, aged forty-four years, who had suffered with lues for twenty-four years, a fracture in the lower third of the tibia with great movability which had given the patient no pain whatever. In other cases pain may be a prominent symptom; for example, a male, aged fifty-two years, in attempting to take something out of his right coat inside pocket with his left hand was unable to finish the muscular action on account of pain in the left shoulder; a fracture of the clavicle was found.

II. FRACTURES ASSOCIATED WITH GENERAL DISEASES. *A. Neuropathies. a. Tabes Dorsalis.* Of the neuropathies in which pathological fractures are observed those in tabes are most frequent. The first observation is by Charcot in 1873. Kredel in 1888 was able to collect 73 cases, and many more are found in recent literature. The fracture may take place in all stages of the disease; it may be the first symptom, and in some cases one or more years may pass before the clinical picture of posterior sclerosis is established. The trauma may be very slight, pain may be entirely absent, except at the moment of the fracture. Dutil, in 1885, records a case of fracture of the radius in a woman while carrying a basket. She was apparently healthy, later symptoms of tabes developed. Tilmann, in 1896, called attention to torsion fractures of the shaft of the femur produced by the patient attempting to pull his shoe off. In some it was the first symptom of tabes, in others it occurred later in the disease. As a rule the clinical picture of tabes is fully established when the fractures take place. In the majority of cases the fracture is situated in bones of the lower extremity. In Kredel's statistics the femur was involved 32 times (9 in the neck); tibia, 19 times; fibula, 2 times; humerus, 4 times; both bones of the forearm, 6 times; clavicle, 2; radius and lower jaw, 1 each. In 16 cases the fractures were multiple. In Durand's statistics of 42 cases: femur, 17; tibia, 10; forearm, 6; clavicle, 3; humerus, 2; scapula, pelvis, lower jaw, and radius, 1 each. Undoubtedly, many fractures are overlooked on account of the absence of the pain, particularly the fibula if the tibia is not broken, or the short bones. Since the introduction of the *x*-ray we may expect more observations of the small bones. Schoonheid reports a case of Korteweg in which there were repeated fractures of the patella, in which the knee was resected; later, however, it had to be amputated on account of non-union. Schultz reports a case of Grunmach in which the *x*-ray of a tabetic foot demonstrated a fracture of the scaphoid bone.

The pathological fractures in tabetic patients, as a rule, heal slowly, but union takes place; usually with excessive callus, Charcot's view that union was more rapid has not been confirmed. In the short bone fractures not infrequently union does not take place at all. I am inclined to think this is due to the late recognition and treatment.

b. Syringomyelia. Grunert finds 13 cases in the literature which he gives in brief. The upper extremity is the more common seat. We know that in tabes the joints of the lower extremities are more commonly involved, while in syringomyelia it is usually the joints of the upper extremity. The pathological fractures follow the same rule. Six cases have been observed in the humerus, usually the surgical neck, both bones of the forearm once; ulna, 3; radius, 2; 1 fracture of a small bone, the metacarpus, has been observed; in only three bones of the lower extremity—2 of the femoral neck, 1 of the tibia. The fractures in the cases recorded have been universally transverse; in 2 of the cases of fracture of the surgical neck of the humerus the head of the bone was absorbed. There is seldom pain except at the time of fracture, and that only occasionally. In all but 1 of these 13 cases the symptoms of a disease of the spinal cord were fully developed and easy to recognize. In 1 case a mistaken diagnosis was made, that reported by Gnesda. The patient was a male, aged thirty-five years. While walking he felt pain in the left limb, he fell; with assistance he was able to limp home, but he thought he felt abnormal mobility in the upper part of the left femur; a swelling developed here. Admitted to the clinic at the fourteenth week the tumor was diagnosed sarcoma and an amputation undertaken. The patient died twenty-four hours after operation from a lung embolus. The autopsy demonstrated a fracture with excessive callus. If this case had been studied with an *x*-ray or an exploratory incision had been made, the proper nature of the disease would, of course, have been recognized.

c. Mental Diseases. There is considerable difference of opinion whether there is an increased fragility of bone in mental diseases. In the recent literature there are no pathological fractures reported in multiple sclerosis, progressive muscular atrophy, or hemiplegia. In the so-called progressive paralysis of the insane fractures of the ribs are most frequently observed. Grunert and other authorities view these fractures as traumatic in origin due to rough handling by the attendants. In the insane asylum in Magdeburg between 1893-1903, ten years, among 2359 insane of which 235 were suffering with progressive paralysis, there were no recorded cases of pathological fracture. Neumann also observed in 327 traumatic fractures in the insane union took place as rapidly as in healthy individuals. This, according to Grunert, is a fact against any specific friability of bone, because in tabes and syringomyelia, in which the bone changes leading to fractures are due to definite lesions of the spinal cord, union is usually retarded.

B. Senile Changes of the Bone. Undoubtedly in old age porosis and fragility of the bones is present. Especially is this seen in fractures of the neck of the femur.

C. Exhaustive Chronic Diseases. In any disease associated with emaciation bone changes leading to fragility may take place. Fractures of the rib from slight injuries, like coughing, are frequently observed. Cases have also been observed in diabetes and chronic nephritis. It is difficult to estimate in these general diseases how much of the bone changes are due to the disease itself, or how much to non-use.

D. Atrophy Due to Non-use. Von Bruns has called attention to the fact that the use of the limb and its weight-bearing function are necessary to the preservation of the complicated architecture of the bone lamellæ, especially the arches. When a limb has not been used for some time, no matter what the cause, porosis and fragility of the bone take place. Union, however, is such cases is not usually retarded.

E. Scurvy. This is such a rare disease in recent times that one would naturally expect little in recent literature. Gurlt records 6 cases and von Bruns 4 more. The only recent communication that Grunert was able to find is by Sutherland in 1898, who records 4 interesting observations, all of them in infants, some of them Barlow's disease or infantile scurvy.[1] The fractures may be multiple of any bone. They are always associated with extensive swellings and ecchymoses. The fracture is always associated with extensive stripping of the periosteum from the bone by hemorrhagic exudate. Under proper treatment the child usually recovers and union takes place. In view of the interest I will give Sutherland's cases in detail. Grunert thinks that while Sutherland's first two cases are really scurvy, the latter two may have been rachitic.

[1] See Osler's Text-book.

Sutherland's Cases of Fragility of Bone in Scurvy.

Case I. Male child, aged four and a half months, fed first on milk, later on meat. Three weeks ago the mother noticed that the child cried whenever it moved its right arm. The arm was swollen, discolored, and paralyzed. The swelling appeared first under the right shoulder and then it extended beneath the elbow. Two days later the left arm showed a similar affection, and in rapid succession there were swelling, softness and loss of motion in both femora, tibiæ, and radii with intense pain.

Examination. Anæmic, poorly nourished child. Gums pale, otherwise healthy. No sign of rickets. Femur and tibia swollen, soft, in a condition of complete pseudoparalysis. The child was apathetic, but cried at the slightest touch. The swellings were irregularly distributed over the bone, now on the shaft, now on the epiphyses. Extensive extravasations of blood on the lower arms. The swellings were apparently subperiosteal; all long bones of the extremities were affected. Several bones were fractured; the right humerus in two places, the left humerus, the left radius, the left ulna, both femora. One of the two fractures of the right humerus was at the epiphyseal line, all the other fractures were of the shafts.

Under milk diet, oranges, grape-juice, malt extract, there was rapid disappearance of the pain in four days. One month later the child was able to move all its limbs voluntarily, firm consolidation of bone, though with considerable deformity.

Case II. Male child, aged twelve months. Fed for first five months on mother's breast, then cows' milk diluted in equal parts with oatmeal, then with meat juice.

On admission distinct signs of scurvy; general anæmia with œdema of the lower extremities. The gum around the incisors swollen, infiltrated and œdematous. Subperiosteal swelling and extreme softness of the bones of the lower extremities. Fracture of both humeri in the upper epiphyseal line. Separation of the upper and lower epiphyses of both tibiæ; shaft fracture of the right tibia.

Firm union with slight deformity under proper diet.

Case III. Child, aged over two years. Had been raised on bread, water, and sugar, and was never well. It had not learned to walk, or talk, and cried with pain when placed on its feet.

At the autopsy five fractures were found.

The left femur was examined more carefully; at the epiphysis definite ossification; the marrow cavity very wide and the bone very thin, porous, slightly indented and resembled a shell. In the upper third there was an ununited transverse fracture surrounded by a considerable mass of callus.

Case IV. Male child, aged two years. Fed upon cows' milk diluted with water. Weak, rickety child with many partly united, partly ununited fractures, principally of the long pipe bones. It is distinctly stated that on admission there were no signs of hemorrhage.

F. Rickets and Osteomalacia. Pathological fractures in rickets are so frequent that Grunert has very little to say about them. In osteomalacia it is usually a bending, although fractures are not infrequent. A new relation of osteomalacia to diseases of the thyroid is brought out in a monograph by Hönnicke.[1] In a patient suffering with *exophthalmic goitre* which proved fatal the autopsy demonstrated osteomalacia of the bones. This led Hönnicke to investigate the subject. He claims to have found that osteomalacia occurs only in districts in which there is goitre. He thinks that the changes in the bones are due to hypersecretion of the thyroid, and advocates partial removal of the thyroid gland. These observations must be confirmed, but it impresses me as conflicting with the experimental work which seems to prove that thyroid secretion is essential for osseous union after fracture.

III. IDIOPATHIC OSTEOPSATHYROSIS. As Grunert has been able to find only a few new cases since Griffith's publication in 1898,[2] he has nothing to add to Griffith's conclusions. There are two recent contributions to this subject not discussed by Grunert; one by Gloye[3] and one by Döring.[4]

BENIGN AND MALIGNANT TUMORS OF THE EXTREMITIES.

This subject was introduced in 1899.[5] At that time I discussed only bone tumors and emphasized the relatively different grades of malignancy which should be recognized in the extent of the operative treatment. In 1902[6] the subject of bone tumors was again taken up along the same lines, and for the first time I mentioned benign bone cysts, with consideration chiefly of König's[7] article. In 1903 all varieties of tumors, except the epithelial, were extensively described in regard to their clinical and gross pathological diagnosis, and the operative treatment based upon their relative malignancy. For convenience they were classified into the following groups: benign connective-tissue tumors and sarcoma, or malignant connective-tissue tumors. The latter were classified into sarcoma of the skin, of the soft parts, and of bone. The next group, the epithelial tumors, were fully discussed in 1904.[1] At the same time discussion of the previous groups was continued.[2] In this contribution to the subject of tumors I not only considered the literature, but drew largely for facts and illustrations upon the material of the surgical pathological laboratory of Dr. Halsted's clinic, of which I have charge. In this discussion, in order to better illustrate the classification, I was compelled to bring in tumors situated in regions other than the extremities. Having now established a working classification, I shall hereafter confine my discussion to tumors arising in the skin, soft parts, and bones of the extremities.

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[1] Monograph, Karl Marhold, Halle a. d. S.

[2] American Journal of the Medical Sciences, vol. cxiii. p. 426.

[3] Inaugural Dis., Kiel, 1904; reviewed in Centralbl. f. Chir., 1905, vol. xxxii. p. 660.

[4] Deutsche Zeitschr. f. Chir., 1905, vol. lxxvii. p. 284.

[5] PROGRESSIVE MEDICINE, December, p. 234.

[6] Ibid., pp. 150–166.

[7] Ibid., pp. 147–204.

The importance of a knowledge of pathology and a better classification of tumors is emphasized in the oration on surgery by J. Collins Warren,[3] of Boston.

I had prepared a paper to read before the American Surgical Association in San Francisco this year on the "Treatment of Tumors Based on Their Relative Malignancy and the Prognosis of the Various Pathological Varieties."[4]

In the discussion of Warren's paper a great deal of stress was laid upon the importance of *frozen sections.* In my own experience, during the last ten years, we have employed frozen sections constantly, but I do not remember a single instance in which, if there was any doubt as to the diagnosis from the naked-eye appearance of the diseased tissue exposed at the operation, the frozen sections could be relied upon.

The entire object of the study and teaching of surgical pathology is to so familiarize ourselves with the clinical picture and naked-eye appearances of certain lesions that the diagnosis can be made without the aid of the microscope. The microscope confirms the diagnosis and aids in the expert training.

As in the past, so in the future, contributions to this periodical I shall attempt, in the study of tumors, first, to illustrate the clinical picture and the naked-eye appearances in such a way that improvement can be accomplished in diagnosis; second, to demonstrate the importance of restricting or extending the operative interference according to the nature of the disease and its relative grade of malignancy.

Benign Connective-tissue Tumors. Under this heading we are interested in selecting those forms of congenital and acquired moles and nævi which have a tendency later in life to become sarcoma.[1] The various forms of fibroma of the skin and the cicatricial keloid are of great practical importance, because of their tendency to become sarcoma.[2] In the possible tumors of the extremities between the skin and bone we must bear in mind the various forms of fibroma, lipoma, and the rare and interesting fibromyxoma of nerve sheaths. The muscle lesions are frequently difficult to recognize clinically from sarcoma. Myositis we have considered in great detail.[3]

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[1] PROGRESSIVE MEDICINE, pp. 134–174.

[2] Ibid., pp. 174–190.

[3] The Surgeon and the Pathologist. A Plea for Reciprocity as Illustrated by the Consideration of the Classification and Treatment of Benign Tumors of the Breast. Oration in Surgery at the Fifty-sixth Annual Session of the American Medical Associaton, Portland, Oregon, July 11–14, 1905. The Journal of the American Medical Association, July 15, 1905, vol. xlv. p. 149.

[4] If this paper is not published in the Transactions of 1905, it will appear in the Transactions for 1906. I was unable to be present to read my paper this year.

Intermuscular Hæmangioma. I mentioned this subject briefly in 1903,[4] discussing the contributions of Stauch and Honsell, which appeared in 1902, and reporting briefly three cases from Dr. Halsted's clinic. These three patients, in whom the angiomata were situated in the thigh, forearm, and calf, are free from recurrence to-day, six and thirteen years since operation. The function of the limb is unimpaired.

I find three recent contributions to this subject by Riethus,[5] Keller,[6] and Sutter.[7] According to the most recent contribution of Sutter, who refers to the others, there are now 40 cases, to which he adds 5, of primary hæmangioma of the muscle. The disease is more frequently observed in the young. Trauma is a frequent etiological factor. The involvement of muscles is somewhat in the following order: thigh, usually the quadriceps, 14 cases; forearm, 8 cases; muscles of neck, calf of the leg, and back, each 4 cases; upper arm and ball of the thumb, each 2 cases; muscles of the foot, chest, and masseter muscle, 1 case each. As to the exact etiology it is yet unsettled. There may be a congenital tumor, but traumatism and the action of the voluntary muscles apparently play an important part. We must distinguish a primary angioma of the muscle from the angioma which begins in the skin, subcutaneous tissue, and secondarily involves the muscle—a more common variety. As in angioma of all tissues, so in the muscle, the vascular tissue may be circumscribed or diffuse, and it differs according to the size of the vessels; it may, therefore, be classified into capillary, cavernous, and telangiectatic. Clinically, the tumor, as a rule, is of slow formation—many years; in a few of rapid growth—a few months. The characteristic symptoms—compressibility, change in size—are not always present, especially in the circumscribed form, and for this reason a clinical diagnosis is not always possible until the muscle is exposed by open incision. The tendency of this form of angioma to become malignant must be unique. No positive cases have been observed. Histologically, in some of the cases mentioned by Riethus and Sutter, the presence of round and spindle cells in the stroma might suggest a malignant change. In most of these tumors the blood spaces are lined by endothelium, and in the wall of this space smooth muscle fibres are found. The stroma is usually a loose connective tissue, very much like the adventitia of the wall of the vessel, and, in addition, one finds many islands of fat. The surrounding muscle shows all stages of pressure atrophy, and in some tumors, usually the circumscribed, the striated muscle bundles may have completely disappeared. According to Sutter, the fat can be explained not as a special element of the new formation, but simply as a tissue replacing the destroyed muscle. It is a fact well known in pathology that when a highly specialized tissue is destroyed it is usually replaced by adipose tissue. As mentioned before, in some cases, one will find in the stroma areas of round and spindle cells which histologically suggest a sarcoma. As a matter of fact, this is not an uncommon finding in many vascular and even non-vascular benign connective-tissue tumors. It is a finding which frequently confuses even the expert when he attempts to base the diagnosis of a tumor on a histological examination only. Among these cases are primary hæmangioma of muscle, none have been reported which resemble the elephantoid hæmangioma or the fibroangioma, which I discussed in PROGRESSIVE MEDICINE for December, 1903, p. 154. One of these cases involved the tendon sheaths of the ankle, but not the muscle; the second involved the muscles of the ball of the thumb; the third was a subcutaneous tumor in the elbow-joint. Since then I have observed a fourth case—a subcutaneous tumor near the ankle.[1] I mention these four cases here because the histological picture very closely resembled a sarcoma, yet clinically they were benign, the naked-eye appearance demonstrated that they were chiefly angioma, and the ultimate results, as the tumors were not completely removed, is a positive indication of their innocent character.

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[1] PROGRESSIVE MEDICINE, December, 1903, p. 149; Ibid., December, 1904, p. 147.

[2] Ibid., December, 1903, p. 158, and 1904, p. 178.

[3] Ibid., December, 1903, pp. 174–185.

[4] Ibid., p. 184.

[5] Beiträge zur klin. Chir., 1904, vol. xlii. p. 454.

[6] Deutsche Zeitschr. f. Chir., 1904, vol. lxiv. p. 574.

[7] Ibid., 1905, vol. lxxvi. p. 368.

Of the forty-five cases now in the literature I will discuss in detail only one, and this because amputation was performed, it seems to me, unnecessarily. The case was reported by Riethus. The patient, a girl aged fourteen years, gave a history of trauma ten years before she came to the clinic, when she slipped and sprained the left ankle. There was no immediate disability. A few weeks later she noticed a swelling in the calf above the ankle. Within a year the swelling increased somewhat and the child limped, because it was painful to walk properly on the foot. Even at this time change in size and swelling was observed. During the next nine years there was no increase of the symptoms. However, a few weeks before she came to the clinic, pain, weakness in the limb, and limp increased. At the examination there was a diffuse swelling, which began on each side of the tendo Achillis and extended up to the junction of the middle and upper third of the calf; the skin was normal; the tumor was doughy and slightly compressible; the superficial veins were not dilated, except over the inner malleolus. The clinical diagnosis was not made. At the exploratory incision, perpendicular from the popliteal space almost to the heel, nothing abnormal was found until the aponeurosis of the muscles was exposed. This fascial membrane was dark blue in color, and on incising it the muscles were ramified with blood-containing, thin-walled vessels; the angioma was present in most of the muscles of the calf; a V-shaped piece was excised without injury to tendons or nerves; the hemorrhage was only moderate and easily controlled by muscle suture. The wound healed per primam. The patient returned in eight months without evidence of improvement. At the second operation the leg was amputated. At the exploratory incision preliminary to amputation it was observed that the posterior tibial nerve was encased in angiomatous tissue. Riethus considered that this explained the intense pain and the inability to walk with the foot flat on the ground. The angiomatous tissue did not extend to the popliteal nerve. Fig. 25 is a sagittal section of the amputated limb; the dark areas represent the extent of the angioma. Fig. 26 will illustrate the histological finding, although this is a section from another case.

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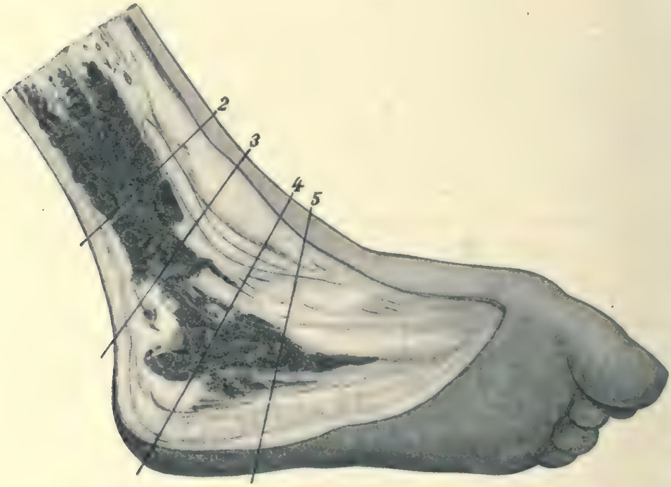
[1] International Clinics, April, 1904, vol. i., fourteenth series, p. 240.

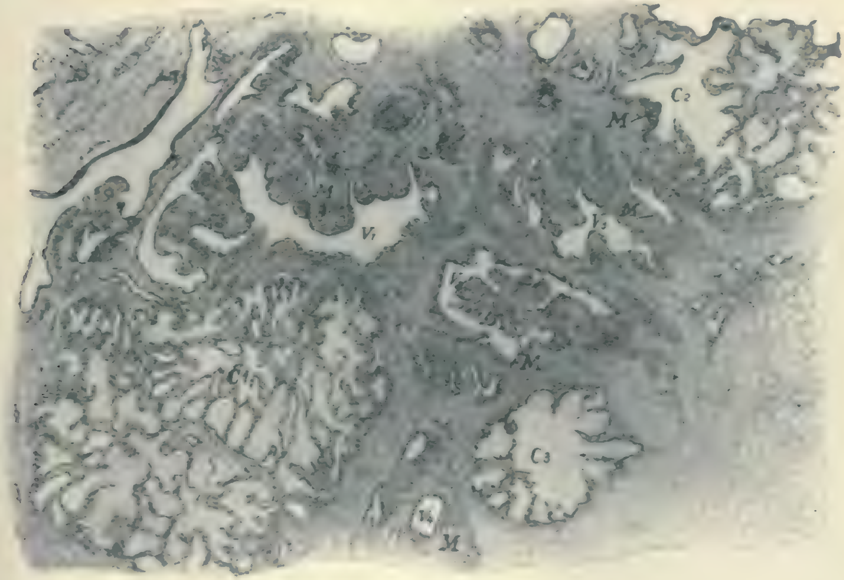
FIG. 25



Sutter records only one other case of amputation. I am quite positive that the extent of the angioma in Riethus' case was no greater than one observed in Dr. Halsted's clinic, involving all the muscles of the calf of the leg, which was completely cured by a more extensive excision of muscle, and I am impressed that in Riethus' patient a second more extensive muscle excision should have been attempted. It is not necessary to remove all of the angioma in these cases, because the scar tissue of the healing process, as a rule, effects a cure, or at least prevents further trouble.

MYOSITIS. I find little to add to my previous discussion[1] on inflammations and tumors of the muscle, except the above, on intermuscular angioma.

FIG. 26



Acute purulent myositis is a rare lesion. Observations in which the pneumococcus is the source of the infection are unique. Pätzold[2] has had one interesting observation, and finds only two others in the literature. The case was apparently a cryptogenic infection, with the formation of abscesses in the biceps, latissimus dorsi, and gluteus. In addition to an abscess cavity due to the myositis there were muscle sequestra, a very unusual finding. The patient was a male, aged seventeen years, who had had fever for fourteen days; on admission there was an inflammatory tumor over the biceps and one over the lower angle of the scapula. A clinical diagnosis of osteomyelitis was made, but at the exploratory incision the true nature of the lesion was demonstrated. Later a third abscess formed and was opened in the gluteus muscle. The patient recovered. Cultures demonstrated the presence of the pneumococcus. One interested in the bacteriology of the pneumococcus will find a most interesting study in the recent number of the *Journal of Experimental Medicine,* August, 1905, vol. vii., No. 5.

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[1] PROGRESSIVE MEDICINE, December, 1903, pp. 177-185.

[2] Beiträge zur klin. Chir., 1904, vol. xliii. p. 668.

MYOSITIS OSSIFICANS. I find a number of interesting communications in recent literature in which, however, there is little to add to our previous discussion. Nadler's[1] communication is of interest because the ossifying areas in the muscles about the lower end of the humerus entirely disappeared. In Frank's article,[2] with the report of two cases, there is an interesting discussion of the literature, practically all of which I have previously considered. Bode,[3] in reporting 4 cases, considers the question of traumatic origin chiefly, and calls the lesion contusion exostosis of the femoral bone. The different views as to the etiology of the bone in the muscle, whether it originates in the tissue between the muscle, or from detached pieces of periosteum, has been discussed. For practical purposes it makes very little difference. The diagnosis is made positive by the *x*-ray. Operation is not indicated at once, because there appears to be a tendency to spontaneous recovery.

However, when the formation of bone continues, associated with pain and some loss of function, excision is indicated. At the operation one should never hesitate to leave bone if its complete removal would jeopardize muscle function or neighboring nerves or vessels. After the operation there is usually some reformation of bone. It soon ceases, then gradually disappears, not always completely. The results of treatment are uniformly good. These remarks are again confirmed by the contribution of Cahier,[4] who considers 134 cases from the literature, 64 involving the muscles of the upper arm, 74 in the thigh, and 6 of miscellaneous muscles. He also brings out a new point in treatment which is to be considered only in the early stage of the disease. Myositis ossificans has a distinct relation to a single or repeated trauma; bone may form within a month after the primary single trauma. During this formative period operation is contraindicated; one must wait, if possible, until bone formation ceases, which can usually be recognized in the *x*-ray. Then operation is indicated as discussed above. Cahier reports cases which have been cured by massage.

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[1] Deutsche Zeitschr. f. Chir., 1904, vol. lxxiv. p. 427.

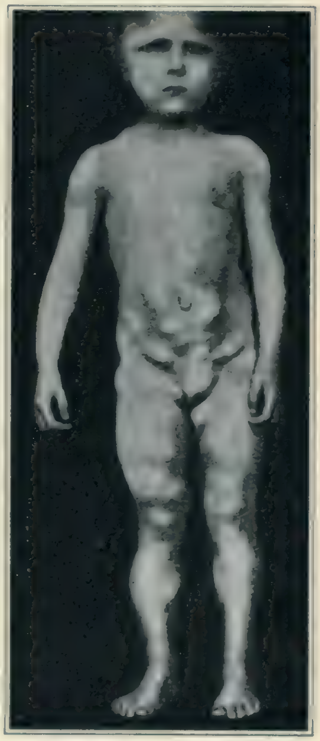
[2] Archiv f. klin. Chir., 1905, vol. lxxvi. p. 883.

[3] Deutsche Zeitschr. f. Chir., 1905, vol. lxxviii. p. 546.

[4] Revue de chir., vol. xxiv., Nos. 3–6; reviewed in Centralbl. f. Chir., 1905, vol. xxxii. p. 142.

Tumors of Nerves. The classification of Virchow into true and false neuromata still holds good. In true neuromata the tumor is composed of nerve fibres, medullated or non-medullated, or of ganglion cells. These are rare tumors. The false neuromata are tumors which arise from the connective tissue of the sheaths of the nerves. They are either fibroma or myxoma. The entire tumor may be only attached to the sheath of the large nerves; this is the most common situation; or it may arise from the connective tissue between the nerve filaments, and so, in its growth, separate the nerve fibres. To completely remove the latter tumor the nerve must be sacrificed, while the enucleation of the former is accomplished without injury to the nerve. True ganglia of the nerves (neuroma ganglionare verum) are rare tumors. In an article by Borst[1] I find excellent histological illustrations of these tumors. Kredel and Beneke[2] have given us a most interesting contribution, with illustrations, on ganglioneuromata and other tumors of the peripheral nervous system. One of their cases was a multiple subcutaneous neuroma in a child aged five years. The tumors contained ganglion cells. In the literature they were able to find reports of two solitary tumors of this character; one clinically and histologically benign, the other histologically malignant and associated with metastases; and a third case in which the tumors were multiple, as in their own observation. Fig. 27 illustrates the multiple tumors in the young child. Clinically, it could not have been differentiated from von Recklinghausen's disease—multiple fibroma molluscum.

FIG. 27



A *ganglion* is a term used in two senses: first, for a cystic tumor in connection with tendon sheaths, bursa, or synovial sac in the joint; or for a part of the nervous system containing typical cells. Custodius[3] describes a most interesting and unique case in which the tumor involving the peroneus nerve near the upper end of the fibula was not a ganglioneuroma, but a true connective tissue ganglion; that is, a cyst due to the myxomatous degeneration of the connective-tissue elements of the false neuroma, or the fibromyxoma of the nerve.

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[1] Die Lehre von den Geschwülsten, J. F. Bergmenn, Wiesbaden, 1902.

[2] Deutsche Zeitschr. f. Chir., 1902, vol. lxvii. p. 239.

[3] Beiträge zur klin. Chir., 1904, vol. xliii. p. 788.

He brings out a new etiological factor as to the formation of the connective-tissue ganglion, with which I was not familiar. Billroth and others have described ganglion as hernial protrusions of the synovial-lined tendon sheath, joint capsule, or bursa. The connection with the original cavity may later be closed off. Custodius, however, considers Ledderhose's view, who describes ganglion as originally a solid connective-tissue tumor in which myxomatous degeneration takes place in focal areas with the formation of multiple cysts, which later may coalesce and form a single cavity. Custodius' tumor of the peroneus nerve was of this character. It was of further interest because it belonged to that variety of fibromyxoma of the nerve in which the tumor arose within the sheath and in its growth separated the nerve fibres. There was a central cavity filled with fluid myxomatous substance. The thick portion of the wall of the cavity contained nerve fibres which had degenerated; while the thin half of the wall contained no nerve fibres. Clinically, the patient, a male aged twenty-nine years, observed, a year before he came to the clinic, as a symptom of onset weakness of the muscles supplied by this nerve and sensory disturbances. At the examination in the clinic,

Fig. 28

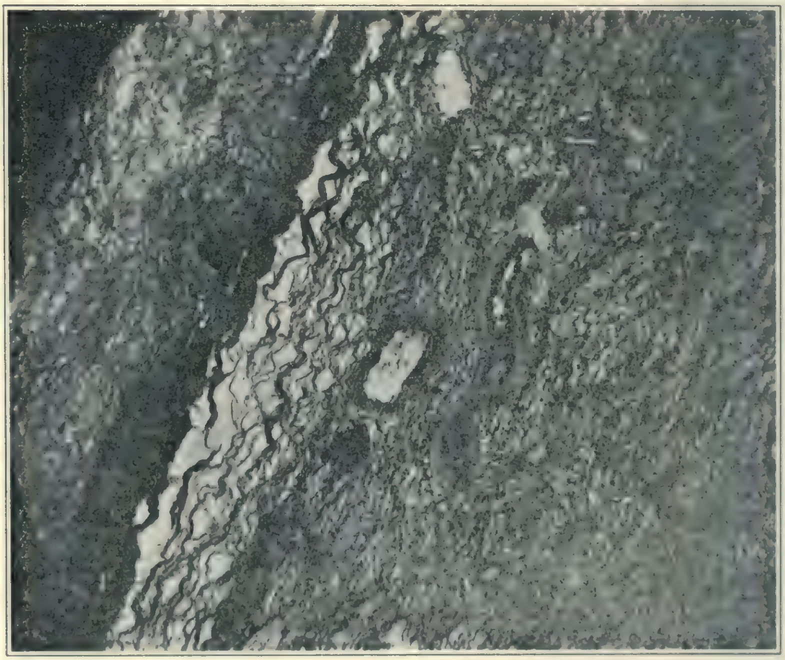
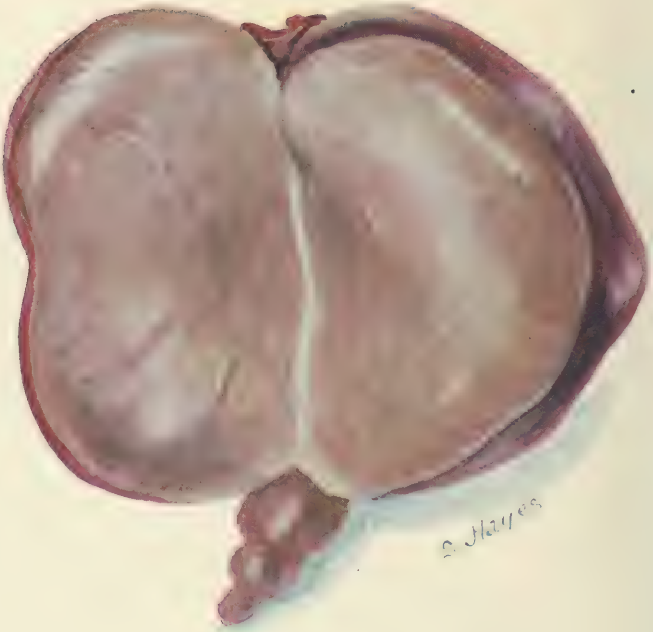


PLATE I.



Sarcoma of the groin.

in addition to sensory and motor paralysis, a tumor not observed by the patient could be palpated posteriorly below the head of the fibula. At the operation it was necessary to resect the nerve in order to remove the tumor.

Plate I. is a beautiful colored painting by Miss Hayes of a fresh fibromyxoma removed by Dr. Finney from the sheath of the nerve in the groin. The tumor has been cut open and the painting illustrates the capsule and the typical naked-eye appearance. At one point the tumor had broken beyond the capsule and was extending along the sheath of the nerve. The patient was a white male aged twenty-two years; the tumor had been observed in the groin two years; there were no other symptoms except tumor. It was freely movable and encapsulated. The histological appearance of the tumor is shown in Fig. 28.

The experience of the surgical clinic in this form of tumor, twelve cases, I have previously discussed.[1] Practically all of these patients I have been able to trace; in none have the tumors recurred. This is the second observation of a tumor of this character in the groin. The other case has remained well seven years.

Lymphangioma and Lymph Cysts. In my previous discussion I was interested chiefly in my own experience and the literature on the relation of lymphangioma of the skin (congenital and acquired mole) to sarcoma.[2] I have not discussed, however, elephantiasis, nor, until this year, was my attention directed to the very important and unique lymph cysts of the thigh.

LYMPH CYSTS OF THE THIGH. In March, 1903, two and a half years ago, Dr. J. F. Mitchell, of Washington, sent to the surgical pathological laboratory a large cyst which he removed from the thigh of a woman aged fifty-four years. The cyst was present on the anterior surface of the thigh and extended from Poupart's ligament to the middle third; it contained cloudy fluid. The wall was about 3 to 5 mm. in thickness, and the entire cyst was easily removed by enucleation. Sections made at that time by Dr. Haskell showed tuberculosis. Unfortunately, I am unable to find the pathological note made at that time and the sections of the original tissue. Dr. Mitchell writes me that four months after this operation the patient developed a tuberculous ankle on the opposite side, since which time he has been unable to trace the patient. This case undoubtedly will be reported later in detail by Dr. Mitchell. I am quite convinced that even from our incomplete data we are justified in the diagnosis of tuberculous lymphatic cysts of the thigh.

In November, 1904, a colored woman was admitted to the surgical clinic of the Johns Hopkins Hospital with a cystic tumor on the inner side of the thigh above the knee and a second similar tumor in the groin. The patient was operated on by Dr. Baer and the two cystic tumors removed, which proved to be lymphatic cysts. The microscopic study of the walls of these cysts demonstrated that a malignant change had taken place, and histologically we have a definite endothelial sarcoma in the walls of these cysts.

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[1] PROGRESSIVE MEDICINE, December, 1903, p. 172.

[2] Ibid., December, 1903, pp. 149 and 166; December, 1904, pp. 174 and 177.

It is this observation that led me to the investigation of the literature on this very interesting and rare lesion. I was able to find articles by Narath,[1] Strehl,[2] and Nordmann.[3]

The cases reported by these authorities are of such interest that I feel justified in reporting them in detail.

These so-called lymphatic cysts of the thigh may be due to congenital or acquired, closed-off pouches of peritoneum, usually present in the situation of a femoral hernia; or, they may be due to the sac of a gravitation abscess from tuberculosis of bone in the pelvis or vertebræ. The bone lesion heals, the typical pus of the tuberculous abscess becomes absorbed, and is replaced by a clear or cloudy fluid. In other cases the cyst is due to an injury of a lymphatic vessel, after which the extravasated lymph becomes encysted (Nordmann).

Nordmann's Case. Cystoma lymphaticum fasciale.

Clinical History. Negative, except for trauma and pregnancy. Onset seven years ago. The patient was in the last month of her first pregnancy when she fell on the right buttock, after which there was local pain. After the birth of the child the placenta was retained and had to be removed. No other complications. The local pain continued and she received treatment for it, but it did not interfere with function of the limb. One year after the injury she first noticed a swelling in the region of the right buttock. This swelling in the following six years had gradually extended from the trochanter to the popliteal space. During this time two children had been born without complications. She sought advice at the clinic because of the size and discomfort of the tumor.

Examination. Occupying the posterior surface of the right thigh there was a swelling extending from trochanter to popliteal space. The skin was normal, except for a few dilated veins. The tumor beneath the skin felt tense, smooth, elastic, in places it fluctuated; it was movable on the skin and deeper tissues. There was no impaired muscular function or sensation; no œdema of the limb; no pain.

Clinical Diagnosis. Lipoma or cyst, probably the former, since the latter is extremely rare.

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[1] Archiv f. klin. Chir., vol. l. p. 763.

[2] Deutsche Zeitschr. f. Chir., 1899, vol. li. p. 178.

[3] Ibid., 1901, vol. lx. p. 572.

Operation. On incision the skin and subcutaneous fat were found normal. After dividing these a smooth, tense, bluish membrane was exposed. There was no difficulty in enucleating this wall from the subcutaneous fat and muscle. It did not extend between the muscles, but the fascia lata must have been part of the wall, because, after the cyst was enucleated, the muscles were naked. The cyst was attached to the trochanter by a fascial band, which was divided. No vessels required ligature.

Gross Pathology. A single cyst 21 by 11 cm.; the wall was 2.5 mm. thick. To the outer surface there were attached some muscle and fat. The inner surface was, as a rule, smooth. There were a few elevated membranous septa and some round elevated spots, which Nordmann calls excrescences. With the naked eye stratification could be seen in the wall. The cyst contained a lemon-colored, clear fluid, of alkaline reaction, coagulating on boiling. Cholesterin crystals floated in this fluid.

Microscopic Pathology. The cyst wall was composed of layers of loose and compact fibrous connective tissue, containing here and there in large and small groups round and spindle cells. The lining of the wall was composed of one or more layers of endothelial cells. In some places the endothelial lining was lost. The contents showed fat drops, round and spindle cells, and cholesterin crystals.

Nordmann considers that at the trauma some years ago a large lymphatic trunk in the fascia lata was torn; lymph slowly extravasated into the connective tissue and, as it accumulated more rapidly than it could be absorbed, the connective tissue about the fluid organized, allowed less absorption, and, since the communication with the lymphatic system was not closed, the accumulation of lymph gradually enlarged the cavity, which became lined with endothelial cells. In support of this view, in addition to the histological examination, there was, after operation, an accumulation of lymph in the wound. This was observed on the tenth day. Nordmann thinks if he had ligated the fascial pedicle to the trochanter he might have closed the lymphatic vessel. As the patient refused a secondary operation, he injected into the cavity, first, iodine, then silver nitrate, without effect; then a 10 per cent. solution of chloride of zinc. This irritant produced necrosis and led to secondary infection, demanding a reopening of the wound. The granulation tissue thrown out closed the leaking lymph vessel, and the wound healed by granulation.

In the examination of the literature up to 1901 Nordmann was unable to find a case in the same situation. The cases of Michel and Velpeau, as well as that of Narath, were situated on the inner surface of the thigh. Morel-Lavallee collected 13 cases of cysts due to lymph extravasation, 5 of which were situated on the thigh.

Nordmann wrote me in November, 1904, that at the examination of this patient, made a few days previous, the patient was perfectly well and there was no evidence of recurrence.

Narath's Case.[1] The patient was a girl aged twenty-two years. In the anterior and outer portion of the right thigh she observed a tumor two years ago, which had gradually reached its present size, of a man's fist, without pain. The patient had observed that the tumor was soft and compressible. There had been no other symptoms.

The examination was negative, except for the tumor. This was situated beneath the skin in Scarpa's triangle between the adductor and extensor muscles of the thigh. The skin was freely movable; the tumor was fixed on the deeper tissues; it was compressible and got smaller, but on coughing filled again. It was not noted whether it could be felt above Poupart's ligament in the iliac fossa when compressed, but Narath could feel a cord the size of two fingers extending from the tumor beneath Poupart's.

Clinical Diagnosis. On account of the absence of any signs of tuberculosis of the vertebræ or pelvis an abscess was excluded. The possibility of a femoral hernia was considered.

Operation. In removing the cyst the operation was an extensive and difficult one. The cyst wall was very adherent to the fascia over the muscles. It extended beneath Poupart's ligament and communicated with a second sac between the peritoneum and the iliopsoas fascia, and this sac extended to the transverse process of the lumbar vertebræ. The communicating sac passed beneath Poupart's ligament to the outer side of the femoral artery.

In making the dissection three skin incisions were necessary—groin, iliac fossa, and lumbar region. The profunda femoral and circumflexa iliac arteries and vein were ligated.

In five weeks the patient was discharged, with two small sinuses.

Gross Pathology. The cyst was single, with septa. The wall varied from 0.5 to 2.5 mm. in thickness. The outer surface was ragged; the inner smooth only in places; in others velvety; there were many nodular growths from inner wall, some cords passing from one wall to the other; some had but one attachment.

Microscopic Pathology. Granulation tissue; outer wall fibrous, inner cellular; in places there was a distinct, irregular, endothelial lining. The tissue projecting from the inner wall described in the gross as nodules and cords was necrotic and took the stain very faintly. At the base of this necrotic tissue there were foreign-body giant cells and spaces, which apparently contained cholesterin crystals.

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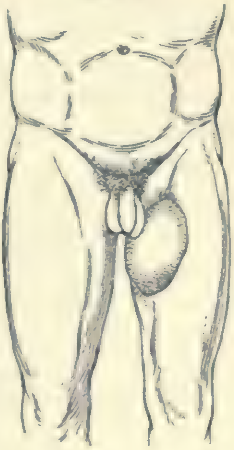
[1] Quoted from Strehl, loc. cit

Contents of the Cyst. One litre of opaque fluid, which coagulated on boiling. The microscope showed cholesterin crystals, leukocytes, fat drops, granular cells, endothelial cells.

Strehl's Case. Retroperitoneal tuberculous cyst. Male, aged twenty years. Seventeen months before admission the patient fell on the right knee and was treated five months for traumatic arthritis, which resulted in a knee somewhat fixed at a right angle. While under treatment he observed in the left groin a painless swelling, which grew slowly. The patient sought the advice of the clinic for his ankylosed knee, which was treated with extension, and recovered.

The tumor shown in the diagram corresponded pretty closely with that in Narath's case. The skin was normal, the tumor fixed between the adductor and extensor muscles in Scarpa's triangle, the size of a fist, with a pedicle extending beneath Poupart's ligament; it was compressible, reappearing on pressure in the iliac fossa, grew smaller when the patient was lying down, reappeared when he was standing or coughed; there was fluctuation, dulness on percussion, but no pain or tenderness. There was no evidence of tuberculosis of the pelvis or vertebræ; tuberculin was not given (Fig. 29).

FIG. 29



Clinical Diagnosis. Having just read Narath's case, Strehl found the similarity so striking that the diagnosis of a retroperitoneal lymph cyst was made. However, von Eiselsberg did not feel that such an extensive operation was justifiable. For this reason only an exploratory incision was made, the contents evacuated, the sac filled with an emulsion of iodoform and glycerin, and the wound closed. The result was not as satisfactory as in Narath's case. At the time of the report of the case the patient had a fistula..

Gross Pathology. The cyst contained about one litre of a yellow serous fluid. The wall of the cyst corresponded with Narath's description; the outer surface was adherent, the inner smooth; or polypoid excrescences, one cord. The sac entered the pelvis to the outer side of the vessel and was sounded as far as the kidney.

Microscopic Pathology. The sections from an excised piece of wall showed two pictures; one similar to that in Narath's case, the other coagulation necrosis on the surface of the wall, and beneath typical tuberculous granulation tissue and typical tubercles.

The microscopic findings in Strehl's case incline him to the view that these retroperitoneal lymph cysts are tuberculous gravitation abscesses in which the contents become serous. The microscopic examination of the contents of the cyst in Strehl's case was similar to that in Narath's case.

Strehl, like Narath, was unable to get the original publications of other retroperitoneal lymph cysts. In December, 1904, Dr. Strehl wrote me that the patient died a few years after operation with symptoms of tuberculosis.

Baer's Case. Pathological No. 5866. Multiple lymph cysts near the knee, groin, and iliac fossa. Malignant endothelium in wall of cysts. Death later from recurrence in abdomen.

The patient was a colored female aged thirty-four years; married; no children. As far as we could ascertain, the family and personal history were negative. The only etiological factor was an infection of the toe of the right foot six months before she came to the clinic. The signs of inflammation disappeared in about one week. Six weeks later the patient observed the swelling on the inner side of the knee and about ten days after this the swelling in the groin. Recently both had increased more rapidly in size and the tumor in the groin had been painful. There has also been pain in the back. At the examination there was a globular swelling 8 by 10 cm. on the inner side of the lower end of the femur extending from the patella to the popliteal space, and a second similar tumor in the right groin, with slight fulness in the right iliac fossa. The skin over the swelling was normal; the tumors fluctuated. On bimanual palpation fluctuation could be obtained between the swelling above and below Poupart's ligament. A clinical diagnosis of tuberculous abscess was made. At the operation on October 31, 1904, by Dr. Baer, the popliteal tumor was first aspirated; it contained a blood-stained fluid, in which, with the microscope, numerous large cells were found. The tumor below Poupart's ligament was first attacked; it was a thin-walled cyst the size of a hen's egg, and contained a reddish-brown fluid with granular particles and loose soft bodies, varying in size from that of a pea to that of a marble. The cyst was enucleated without much difficulty. A second incision was made above Pourpart's ligament, and a similar cyst exposed; it was situated in the iliac fossa, outside the peritoneal cavity, behind the muscles. It extended upward toward the lumbar vertebræ and downward into the pelvic cavity. A small portion of the sac which extended high up toward the lumbar vertebræ was not removed, as the operator considered the lesion a cystic sarcoma and inoperable. (The relation of this sac was similar to that in Narath's case, who made an incision in the lumbar fossa to completely remove this portion.) The tumor in the region of the knee-joint was easily removed by enucleation. All wounds were closed without drainage. The patient left the hospital about four weeks after operation with evidence of recurrence in the abdomen, and died a few months later. An autopsy was not allowed.

Gross Pathology. When the tissues were received in the laboratory I was impressed from the clinical history that accompanied them that we were dealing with a unique lesion. Apparently, there were three distinct cystic tumors, as Dr. Baer informs me that there was no evidence of communication between the tumors above and below Poupart's ligament. The contents of the cysts were similar—blood-stained fluid containing leukocytes and numerous swollen round cells, resembling endothelial cells. The wall of each cyst was a distinct membrane; the lining of each was hemorrhagic, in places smooth, in other places thrown into folds, and here and there small excrescences, as described in the previous cases. These nodules are a characteristic formation on the surface of the wall of the cyst. The thickness of the wall varied from 1 to 4 mm.; in the thick portions I could recognize lamellæ separated by minute spaces. The outer wall was composed of loose connective tissue containing fat.

Microscopic Pathology. Under the microscope the cysts had an endothelial lining; in the wall of the cyst there are numerous spaces lined by endothelium; in the thicker portions of the wall there are numerous alveoli filled with proliferating round cells. Dr. Welch considered this picture as histological evidence of a malignant tumor—an endothelioma.

I have been unable to find in the literature a similar observation. It is hard to conceive that the primary tumor was the cyst of the knee, and that the secondary cysts were of metastatic origin. Each tumor impressed one as of primary origin—a dilatation of a lymphatic vessel. There is nothing, therefore, clinically or in the gross pathology which can be regarded as malignant. Of course, it is quite possible that a malignant change has begun independently in the endothelial cells in the wall of each cyst. That the tumor recurred can be explained by the fact that it was not all removed.

I trust that a further study of this case and of the literature may throw some light on the question.

There is an older article on cysts of the thigh, groin, and iliac fossa by Schank.[1] His classification demonstrates the great variety of etiological possibilities.

He divides them into two great classes: (*a*) cysts related to the spermatic cord; (*b*) cysts originating from tissue other than the spermatic cord.

Among the cysts which may arise from the tissues of the cord we have the hydrocele, or the so-called hydrocele of the canal of Nuck in the female, or the hydrocele of the cord in the male. These sacs may or may not communicate with the peritoneal cavity; they are, of course, of congenital origin. Sometimes they contain blood. These cysts may be multiple and may be situated in the abdominal cavity. We also have the cysts in the groin, inguinal canal, or in the region of the femoral canal, due to closed-off sacs of acquired hernia. The cysts may be single or multiple.

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[1] Archiv f. klin. Chir., vol. lv. p. 316.

Of the cysts which form from tissue other than the spermatic cord there are the atheromatous and serous cysts of the skin and the hygroma of the muscle sheaths, the true lymph cysts which we have just described, the dermoid and echinococcus cysts. The possibility of a blood cyst, a hæmangioma, is not discussed by Schank.

This very interesting communication, which has not been duplicated in recent literature, demonstrates the numerous possibilities in the differential diagnosis of tumors in the upper portion of the thigh.

Czerny[1] considers only the tumors and pseudotumors in the adductor region of the thigh. I was impressed with the value of this article after I saw a case with Dr. Watts, the assistant resident surgeon of Johns Hopkins Hospital. His patient had a diffuse tumor occupying the adductor muscles close to the pelvis of but a few months' duration. There were no signs or symptoms of a bone lesion. Clinically, it was considered an inoperable sarcoma. The patient, however, was given the benefit of the doubt, and at the exploratory incision the tumor proved to be a gravitating tuberculous abscess. The patient recovered. In a recent observation of my own, in which the tumor was situated in the same region, but on palpation was less diffuse and more like a circumscribed abscess or a cyst, the exploratory incision demonstrated that we had an infiltrating intermuscular sarcoma of the most malignant type. This case will answer as a good illustration of the attitude one should assume with tumors.

The clinical diagnosis was doubtful. The tumor in the adductor region was apparently operable; it had been present six months; however, during the last three months the patient had lost so much flesh and strength that it would be difficult to explain this, except by a general metastasis. In addition he had a cough and expectoration which might have been interpreted as symptoms of tuberculosis of the lungs, which would have suggested that the tumor in the adductor region was a gravitation tuberculous abscess from a tuberculous focus in the pelvis or vertebræ. The physical examination, however, of the lung was negative, and the slight expectoration contained no tubercle bacilli. At the operation, demonstrating that the tumor was an intermuscular sarcoma of the most malignant variety, I felt that the patient for the few months that he had to live would be more comfortable if the tumor was not disturbed. An attempt at local excision might have demonstrated its impossibility without ligation of the femoral vessels, which in the majority of cases would have necessitated amputation. The patient remained in the hospital for four days after the exploratory incision under cocaine. During the few months that he lived he was able for the greater part of the time to walk about and suffered no discomfort from the tumor.

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[1] Deutsche med. Wochenschr., 1903, vol. xxix. p. 397.

This question as to our proper attitude toward benign and malignant tumors is especially illustrated in lesions near the vessels of the thigh. One should not mutilate a patient by a hip-joint amputation for those tumors of a relatively high degree of malignancy, if experience teaches that death is practically certain from internal metastasis, unless the tumor itself is giving sufficient discomfort to justify amputation.

On the other hand, if the tumor is of a relatively low grade of malignancy in which metastasis can be expected late, one is justified to perform an operation of any extent, if the chances are good that it will ensure a permanent cure.

Blood Cysts of the Thigh. In my investigations on the subject of lymph cysts I was reminded of an observation of my own which, I think, was a venous cyst. The patient was a married woman aged twenty-eight years. She came under my observation in January, 1900, because of a swelling in the right groin, which had been present about a year. There was no history of traumatism. The patient was delicate and frail. The examination was negative, except for the tumor situated to the outside of the vessels in the right side of the groin. The tumor was apparently spherical; the skin was normal; the femoral artery was felt to pulsate over the inner medial anterior surface. The tumor was firm in consistency and there was no pulsation. It extended behind the vessels and occupied the upper portion of Scarpa's triangle below Poupart's ligament. It did not fluctuate. There was no œdema of the leg below the tumor. It seemed to be definitely circumscribed. At that time, five years ago, my experience and knowledge of tumors in this region was very scanty, but I find in my notes the statement that the probabilities of a sarcoma are very slight on account of the duration of the tumor—one year—and the absence of any evidence of local infiltration; that its position behind the vessels excludes a metastatic tumor to the glands in this region, and that the diagnosis lay between a benign connective-tissue tumor and a tuberculous abscess. Before operation the patient's blood count demonstrated chlorosis (hæmoglobin, 55 per cent.; red cells, 5,000,000). At the exploratory incision the capsule of the tumor was exposed between the vessels and the sartorius muscle; in the fascia and fat over the capsule there were numerous veins. Quite a number of this plexus of veins had to be divided before the capsule was reached. The external circumflex artery passed over the inferior border and was divided; having exposed the capsule, I was able to demonstrate fluctuation. I must confess that at this point I did not know how to explain a cyst in this region. The tumor was aspirated, the contents were clear; on standing it coagulated. There was no evidence of blood. In view of the close proximity of the large femoral vessels to the capsule of the tumor I thought it best to open the cyst before attempting enucleation. The walls varied from 2 to 3 mm. in thickness, and attached to the inner wall were partly organized lamellæ of fibrin that one frequently sees in an aneurysm. The incision into the cyst immediately allowed the evacuation of its clear fluid and relieved tension; in a moment from the depth of the cavity there welled up blood of such an amount that one could be quite certain that the cyst communicated either directly with the femoral vein or a large branch. The hemorrhage could be stopped by packing. It could be lessened by pressure on the femoral artery. The loss of blood even in these few moments was sufficient to affect the patient's pulse. For this reason, in view of the benign character of the cyst and its intimate relations to the femoral vessels, I considered an attempted excision out of the question. In the first place, the general condition of the patient contraindicated a long operation; in the second place, to completely remove the cyst the femoral vessels might have to be ligated.

The packing, which was placed unusually tight, was removed slowly. The wound filled with granulation tissue and the patient left the hospital at the end of about six weeks with a small fistula. I thought that I had accomplished a cure, yet there was one observation that suggested that the endothelium-lined cavity would act in the same stubborn way as one lined with epithelium. From this fistula the amount of serum discharged was copious, a discharge never observed from simple granulation tissue; in addition, there were a few slight hemorrhages. The patient was comfortable for about eight weeks, and then returned to the hospital, because of the copious discharge which now and then was hemorrhagic. Occasionally, the external opening of the sinus would close; then the patient would suffer a great deal of discomfort; material evidently accumulated, because in a few days it spontaneously opened. The danger of a complete excision was explained to the patient; she refused to allow any operation which endangered the limb.

Every possible local application failed to accomplish healing. The patient was showing signs of loss of strength due to the copious serous discharge with now and then considerable hemorrhage. At the second operation I attempted to remove as much of the cyst wall as was possible without jeopardizing the femoral vessels. A second incision was made in the adductor region and a portion of the cyst behind the vessels removed. The cyst was found to practically surround the great vessels, except on their anterior surface. This portion of the cyst wall could not be removed.

Healing was not accomplished, and the patient died of exhaustion three years and nine months after the first operation.

With our present knowledge it would have been better, in this case, at the first operation, after the aspiration to do nothing, observe the patient, and, if the tumor showed a tendency to become larger, to explain the nature of the disease and the possibility of the loss of the limb in order to cure it. Then, at the operation, one could first expose and separate the femoral vessels. If this could be accomplished without their injury a complete removal would be possible; if not, the vessels could be ligated and the cyst excised. If gangrene developed later the patient would lose the limb, either above or below the knee. That is, ligation of both femoral vessels is not always followed by gangrene; when gangrene does take place the line of demarcation is usually below the knee. I am quite convinced that even at the second operation, if my patient had given her consent, her life could have been saved, perhaps at the expense of the limb.

I have searched everywhere for similar cases. Hewett[1] reports an observation of a blood cyst in the thigh in a woman aged twenty-five years. The cyst was incised and the thin membrane dissected out; it was only slightly adherent to the femoral vessels; the patient was traced for three years without recurrence. The observation of George Lawson[2] in the first instance was considered a blood cyst of the thigh. The patient was a woman aged fifty years; the fluctuating tumor the size of an orange on the lower and inner part of the right thigh had been observed ten months. Lawson, at the operation, after the skin incision, aspirated dark blood and for this reason amputated the thigh in the middle third. In the pathological note the so-called blood cyst resembled the cysts in Baer's case just described, and a histological diagnosis of an endothelioma was made. The patient was observed five years later with a recurrence in the stump. Death took place and the autopsy demonstrated metastasis. E. Le Beck[3] observed what he considered a blood cyst in the thigh. The patient was a female aged forty-seven years. The symptom of onset was intense pain in the knee followed by the formation of a tumor. Beck saw the patient at the end of four months. The tumor was situated on the inner side of the lower portion of the thigh, extending from the patella to the popliteal space; it fluctuated; there was no pulsation. At the aspiration he removed blood. The relaxed cyst immediately refilled. The treatment consisted of aspiration and compression dressing, which after a number of weeks accomplished a cure. The question naturally arises, Was this a blood cyst?

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[1] British Medical Journal, October 24, 1857, p. 897.

[2] Transactions of the Pathological Society of London, 1867, vol. xviii. p. 272.

[3] Gazette des hôpitaux, October 2, 1886, vol. lix. p. 921.

It impresses me that the possibility of a hemorrhagic bursitis in a hæmophilic patient must be considered.

Ahrens[1] reports a very interesting observation in which, after a supracondylar fracture of the femur with union in a faulty position, the constant trauma to the knee-joint produced a recurrent hæmarthrosis or blood cyst in the knee-joint. Repeated aspiration of the bloody exudate did not relieve the condition; an osteotomy correcting the deformity did. The patient gave a history which we must interpret as indicating a hæmophilic dyscrasia.

Sarcoma of the Skin. The classification which I suggested in 1903[2] was as follows: 1. Lymphangiosarcoma, with or without a history of congenital mole. 2. Hæmangiosarcoma, with or without a history of congenital nævus. 3. Sarcoma arising in skin scars. 4. Mycosis fungoides. To this I should like to add a fifth, sarcoma arising in fibroma or true keloid of the skin, or in fibroma molluscum. So far in the experience of the surgical clinic, or from the extensive study of the literature, I can find no recorded cases of a permanent cure in the first two groups. One must, therefore, be on the lookout for the congenital mole and nævus, which have a tendency to become malignant later in life and urge their removal in the benign state. Since 1903 the number of these benign tumors which have been received in the surgical pathological laboratory has increased, I should think, at least twenty times. The curability of the sarcoma which arises in the skin scar or in the fibroma varies according to the histology. The prognosis in the round-cell tumors is bad, in the fibrospindle-cell tumors it is good.

Recently two very interesting cases of sarcoma originating in the bed of the nail of the thumb have come under my observation. Plate II. is a painting of a sagittal section through the amputated right thumb. The pigmented tumor in the bed of the nail is beautifully illustrated. The patient was a male aged fifty-two years; three years and nine months ago he received a contusion to this nail and three months later observed an area of pigmentation which increased in size, and a fungus growth appeared from beneath the nail at the end of the thumb. About two years ago this was partially removed; eight months ago he observed enlarged glands in the axilla. At the operation the thumb was amputated and the glands in the axilla removed. The glands showed the same deep pigment observed in the tumor. The microscopic study of the tumor (Fig. 30) demonstrates it to be a pigmented lymphangiosarcoma. This patient died a few months after operation.

The second case is of special interest because the lesion was diag-

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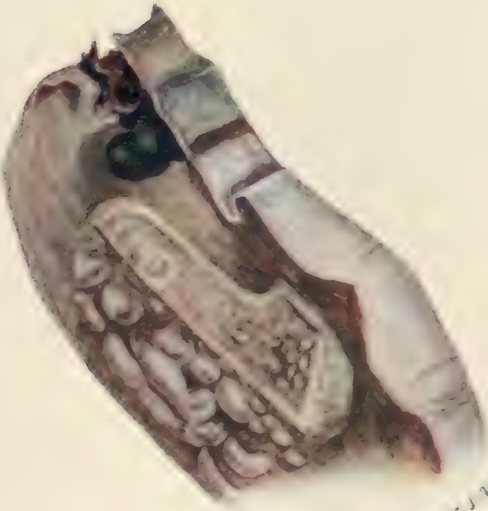
[1] Zeitschr. f. orth. Chir., 1904, vol. xiii. p. 357.

[2] PROGRESSIVE MEDICINE, December, p. 149.

PLATE II.



Sarcoma of skin.

nosed senile gangerne and the thumb amputated. It is now four months since the operation, and the patient has symptoms of internal metastasis. Fig. 31 pictures the specimen as it was received in alcohol in the laboratory. The pigmented streak of the remaining half of the nail and a fungous pigmented ulcer occupying half of the bed of the nail would allow a positive diagnosis. A sagittal section (see central figure) shows a finely granular pigmented tumor pretty well circumscribed. The microscopic picture of this tumor was identical with that shown in Fig. 30.

FIG. 30

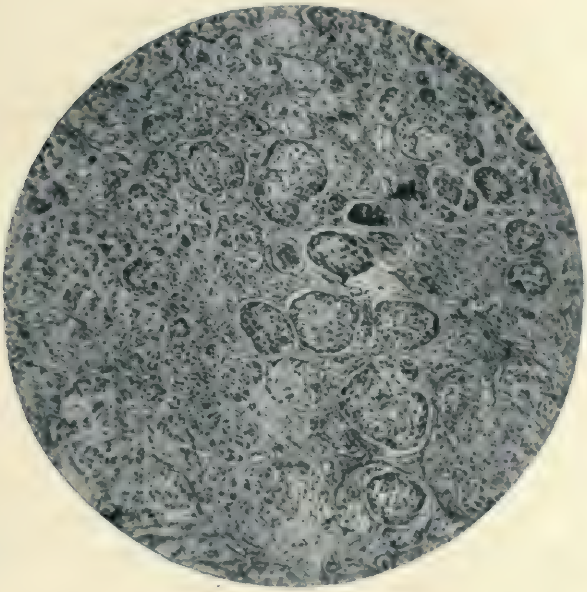
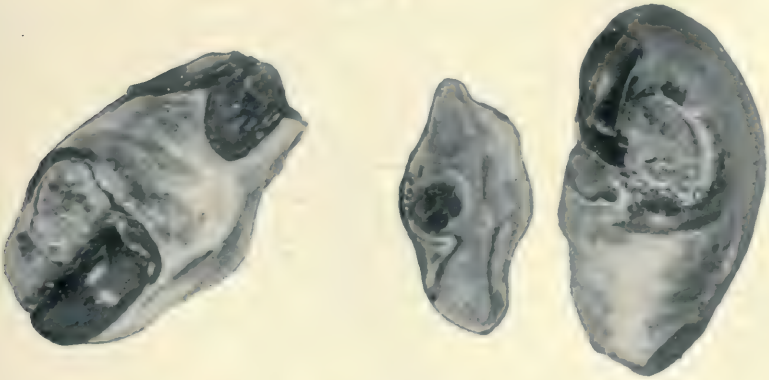


FIG. 31



This patient was a white woman aged seventy-six years, who received a traumatism to this nail one year before operation, which was followed by a pigmented stripe beneath the nail shown in the illustration. In the next few months nothing was observed except an increase in the width of this pigmented stripe. Three months after the traumatism she injured the nail again; half of the nail was then shed and revealed the pigmented fungous ulcer shown in the illustration.

Tumors arising from the bed of the nails are rare. This is my third observation. The other patient came to the clinic with an inoperable metastatic tumor in the right groin. A pigmented tumor which he had not observed was found by Dr. Cushing beneath the nail of the great toe. The patient died a few months after leaving the clinic.

Finger Tumors. These three cases stimulated me to the investigation of the literature on the subject of tumors of the fingers. They are so rare that they receive scanty mention in text-books, nevertheless knowledge of this subject is of great practical importance. The most recent article among the very scanty literature is by Suter,[1] who in reporting a single observation refers to the most recent and complete contribution by Müller.[2]

Müller was able to collect 16 cases from v. Bergmann's clinic in Berlin, and classified them as follows: lipoma, 2 cases; ganglia, 5 cases; encysted foreign bodies, 2 cases; fibrosarcoma, 6 cases; subungual perithelioma, 1 case.

LIPOMA OF FINGERS. I have never observed a case. Müller's 2 cases are of great interest. In one the patient was aged seventy-two years. Forty years before, at the situation of the lipoma, he received a small injury which left a scar; six years ago only he observed a small tumor on the dorsal surface of one of the fingers. The tumor was 1 cm. in diameter and had the distinct lobulations of a lipoma. It was easily removed by enucleation. In the second case the patient was a child a year and a half of age. The tumor had been observed by the mother sixteen months. It was the size of a bean and smooth, it did not have the lobulation of the lipoma on the dorsal surface.

Steinheil[3] has reported 14 cases of lipoma on the hands and fingers, Richardson[4] 3 cases. This was practically all the literature on the subject that Müller could find, sufficient, however, to disprove the statement of Busch[5] that they never occur on the fingers. It is interesting to note that when the tumors are situated on the extensor surface, perhaps on account of the thinner skin, the lobulation of the lipoma can be made out clinically, but when they are situated on the flexor surface the tumor is smooth and tense, and for this reason is frequently mistaken for a ganglion. Little is definitely known to explain in all cases the etiology and localization of lipoma. Grosch[1] has formulated the rule from his extensive observations that lipomata develop in regions of the skin where the glands are scanty; in the skin of the fingers the glands are most numerous. This may explain the rarity of lipoma. Yet, on the other hand, single or repeated trauma has been considered an etiological factor; for example, the lipoma of the shoulder in hod-carrying laborers. Yet the fingers are subjected to more traumas than any other part of the body.

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[1] Archiv f. klin. Chir., 1905, vol. lxxv. p. 624.

[2] Ibid., 1901, vol. lxiii. p. 348.

[3] Beiträge zur klin. Chir., 1891, vol. vii.

[4] Northumberland and Durham Medical Journal, July, 1900.

[5] Archiv f klin. Chir., vol. vii.

GANGLION OF THE FINGERS. In Müller's five cases none were subjected to operation except in a few in which the cyst was ruptured by pressure. He was unable to ascertain the result of this treatment and does not recommend it. The chief point in diagnosis is that the ganglion is situated on the flexor side and has a lateral position near the tendon. This is a new point in diagnosis with which I was not familiar. Ganglia, as a rule, give so little trouble that few patients seek the advice of the clinic. One should, however, leave them entirely alone or subject them to removal by open incision.

ENCYSTED FOREIGN BODIES IN THE FINGER. The first case is of interest because it illustrates the histological picture of the early inflammatory stage about an apparently sterile foreign body. The patient was a male aged thirty-five years; three weeks before the operation in picking leaves a small thorn pierced and buried itself in the skin. The primary swelling disappeared in two days, leaving a movable, painless, shot-like tumor beneath the skin on the extensor surface of the right, middle finger. At the operation the skin was normal, and a small nodule was excised. This nodule consisted of a small cavity containing a vegetable thorn. Microscopically the tissue near the lumen contained many polymorphous leukocytes, a few giant cells in a cellular stroma; the next zone consisted chiefly of fibroblasts and capillaries in a cellular stroma, very few leukocytes, and no giant cells. The next zone was chiefly fibrous tissue, beyond which was the normal fat and loose connective tissue present in this region. I describe this histological picture in detail because granulation tissue is sometimes very difficult to differentiate from sarcoma. I shall mention this subject again.

The second case illustrates the older histological picture of an encysted foreign body. The patient was a female aged twenty years. She recollects that while ironing six months ago she had a sharp, stabbing pain in the ball of the right thumb, but could find no wound or see any blood. Since this time certain motions of the thumb have been painful. At the examination one could make out in the ball of the thumb beneath the normal skin an area of induration. At the operation a fibrous mass was excised which contained in its centre a needle. Microscopically the outer wall was more fibrous than in the preceding case and more sharply circumscribed from the surrounding normal fat and muscle. In the central zone, as in the previous case, there were still capillaries to be seen and fibroblasts.

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[1] Deutsche Zeitschr. f. Chir., vol. xxvi.

The inner zone, next to the lumen, was composed chiefly of an intercellular substance in which there were a few cells and fibroblasts with pigment, here and there blood pigment. There were no polymorphous leukocytes and no giant cells.

One should bear in mind the possibility that an encysted foreign body may be the etiological factor in a tumor formation. A small sequestrum of bone from a healed osteomyelitis may be the foreign body. In this case the patient would give no history of injury, and the symptoms of subacute osteomyelitis may have been forgotten. I recollect such an observation in the breast. The patient presented herself with a clinically doubtful tumor. It felt like a small infiltrating scirrhus, but there was no change in the subcutaneous fat or skin, and the nipple was not retracted; it had been observed two or three years. At the exploratory incision there was an area of fibrous tissue in the lumen, of which there was a minute bone sequestrum.

Fibrosarcoma of the Tendon Sheaths. These are the most common tumors. They are observed both in youthful and older people, they are of slow growth, usually painless, and are situated on the flexor side. At the examination the tumor, as a rule, is distinctly encapsulated and very hard. At the operation the tumor is attached to the sheath of the tendon and easily removed by enucleation. Müller followed all of his six cases and observed no recurrence. Histologically, Müller's tumors were chiefly composed of spindle cells. In addition, there were many giant cells, only a very few vessels, and here and there small areas of free blood and blood pigment. Müller felt that he could positively demonstrate the origin of these tumors from the sheath of the tendon. He compares these tumors to the fibrospindle and giant-cell epulis, which, we know, is a tumor of a low grade of malignancy. In one of his cases in which the tumor was larger it pressed upon the phalanx and had produced a small concavity (pressure atrophy of bone), but the periosteum between the tumor and bone was intact. The literature on these tumors is scanty. He gives four references in which the clinical and histological description agrees with his own.

I have previously discussed the experience of the surgical pathological laboratory.[1] My observation on 7 cases is somewhat similar to Müller's. In one of the patients, however, the tumors were multiple, and in one the tumor was present on the extensor tendon. In one case the tumor was a pure œdematous fibroma with a few areas of recent hemorrhage surrounded by round cells, which I thought could be explained by the recent trauma. This tumor had been present for the last twenty-five years. The patient sought the advice of the clinic because the tumor had become painful after a recent trauma. Of the other cases one was a pure spindle-cell tumor, 3 fibrospindle-cell tumors, and in only 2 cases were the tumors fibrospindle giant-cell, similar to the case of Müller. All of these patients have remained well since the removal of the tumor.

It is a question in my mind whether these tumors should be called sarcoma. The experience of Müller and the authorities referred to, as well as my own, fail to find a single instance of such tumors exhibiting a single characteristic of a malignant tumor except histologically.

Fig. 32

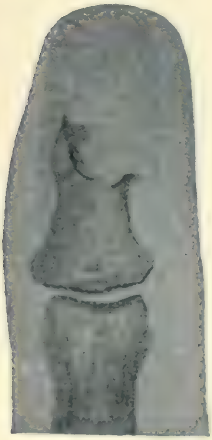
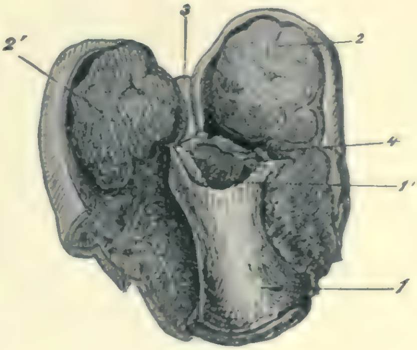


Fig. 33



Suter's[2] observation is of particular interest on account of its unusual situation beneath the nail and because it produced pressure atrophy of the end phalanx. The patient was aged thirty-nine years, and gave a history of an incised wound of the end of the left thumb which healed properly and in the scar of which he observed no symptoms for four years. Now, four years before he came to the clinic, his attention was called to the end of his thumb by pain and tenderness, and he observed a growth projecting from the finger between the nail and the flesh. It was treated for ingrowing nail without relief. He sought advice in the clinic because of increasing pain and weakness in this thumb. Fig. 32

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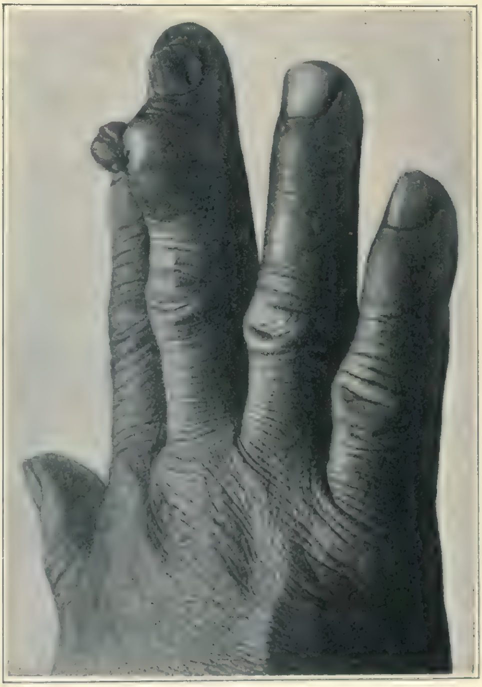
[1] Progressive Medicine, December, 1903, p. 171.

[2] Loc. cit.

is an x-ray of the finger. It illustrates the outline and position of the tumor and the irregular destruction of bone. The nail over the tumor was thin, and the portion of the tumor which projected between the nail and the skin had a slightly ulcerated surface. Histologically, the tumor removed by amputation was chiefly a pure fibroma, but the portion toward the bone was cellular, contained areas of blood and pigment, and resembled somewhat a sarcoma. The gross appearance of the tumor is shown in Fig. 33. I am impressed that this tumor is not from a tendon sheath, but either a fibroma in scar tissue or a periosteal fibroma.

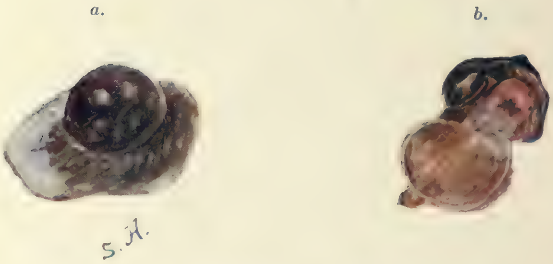
Fig. 34



Its long duration and the character of the bone destruction are indications of a benign tumor or one of a very low grade of malignancy. In his discussion of the literature Suter adds nothing which has not already been given us by Müller, except Gurlt's statistical statement that among 14,630 tumors but 84 were situated on the hand and fingers, and the majority of these on the hand.

A recent observation of my own is of sufficient interest to discuss here from the fact that the subcutaneous tumor had been present on the extensor surface of the finger and to the lateral side of the tendon, which

PLATE III.



Fibroadenoma of skin.

is the usual position of a ganglion. The second point of interest is that the patient, a colored woman aged fifty years, caught the finger between the door and the post, tore the skin and almost enucleated the encapsulated neoplasm. Fig. 34 shows the tumor and its prolapsed portion. The injury had taken place only three days before. The tumor was easily removed by enucleation. Plate III. *a* is a painting of the prolapsed portion of the tumor which is covered with a dried blood clot, black in color, and the surrounding pigmented skin of a colored woman. Plate III. *b* is a gross section through the tumor. The prolapsed portion is separated from the subcutaneous portion and is covered with a dried blood clot. The tumor has the appearance of an œdematous fibroma with areas of recent hemorrhage. Microscopically it is chiefly a pure œdematous fibroma with areas of hemorrhage surrounded by cell proliferation. There are no giant cells.

Subungual Perithelioma. The one observation of Müller is of great interest because it describes a tumor beneath the nail, clinically benign, histologically malignant, a tumor which I have never observed and one which differs clinically and histologically from the three pigmented alveolar sarcomata which I have described in the beginning of this subject. The patient was a female aged forty-four years. She gave a history of contusion to the nail of the right fourth finger, since which time she has observed a bluish area beneath the nail, which was very painful and tender; increase in size has not been observed; the nail had not been lost; she sought the clinic on account of pain and tenderness. At the examination the nail was thin, beneath the nail there was a blue elevated area. At the operation, after extracting the nail, a flattened, spherical tumor 1 x 1.8 x 1.4 cm. was found. This tumor pressed upon the bone, and produced a depression, but between the encapsulated tumor and the depressed bone the periosteum was intact. The tumor was removed without amputation. Clinically and gross-pathologically one can interpret this small tumor only as benign, yet histologically it was a cellular tumor in which the cells were arranged about capillaries. The tumor had an epithelial covering derived from the germinal layer of the nail. I shall not go into the minute histological description nor the discussion, but the tumor is composed of small capillaries. Outside of this layer of normal endothelium there are areas of proliferating roundish cells which morphologically are not the germinal epithelium of the capsule. The portion in which there are no cells and no nuclei is considered by Müller to be due to regressive changes; that is, a substance due to the degeneration of the cells of the tumor. Müller was able to find in the literature similar observations by Kraske, Schuh, and Volkmann. In all of these observations the tumor was clinically benign and of long duration. The patients sought advice in the clinic because of pain and tenderness which in Kraske's case made the patient so miserable that she was treated for a number of years for neurasthenia. In none of these observations was recurrence or metastasis noted. In Kraske's patient amputation was performed which Müller, quite correctly, considers unnecessary.

Periosteal and medullary sarcoma of the bones of the finger must be unique. Müller could find none, and in the literature since then I have been unable to discover any reports. Codman[1] observed a medullary myxoenchondroma of the second phalanx of the finger, and in Heineke's case[2] of multiple benign bone cysts one cyst was noted in the phalanx of the great toe, but none in the fingers.

Inflammatory lesions of the soft parts and bones of the fingers are much more frequent. A finger removed by amputation on the diagnosis of periosteal sarcoma was sent to my laboratory recently, but the pathological examination demonstrated it to be an ossifying leutic periostitis. The fibrous nodes observed on the fingers and the bony growth in chronic arthritis deformans are not difficult to recognize.

Epithelial tumors on the fingers are also rare, except perhaps the benign papillary wart. I have recently observed an example of a basal-cell epithelioma (rodent ulcer) on the finger which was mistaken clinically for leprosy. I will mention this again under epithelial tumors.

Recent literature gives me no references to the hæmangiosarcoma, the sarcoma arising in skin scars or in fibroma of the skin. This subject I have fully discussed before. It is rather interesting, however, to note that in the cicatricial keloid which so frequently histologically resembles the spindle-cell sarcoma, I cannot find a single instance of a malignant tumor.

Mycosis Fungoides. This rare lesion of the skin which I have discussed with illustrations[3] and the possible relation of which to Hodgkin's disease I have called attention to,[4] has recently been considered by Pelagati[5] as a lesion of the skin associated with leukæmia. His observation with autopsy and blood findings is described in great detail. The original article I could not obtain. The reviewer in the *Centralblatt f. Chirurgie* is inclined to view the diagnosis of mycosis fungoides as questionable, and the blood findings as not positive of myelogenous leukæmia. The possibilities, however, of this rare lesion which may begin primarily on the skin of the extremities should be borne in mind, and the cases when they come under observation carefully studied with blood examinations, which until the work of Pelagati has been neglected. The x-ray should always be tried as a therapeutic measure.

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[1] Progressive Medicine, December, 1904, p. 185.

[3] Ibid., p. 187.

[2] Ibid., December, 1903, p. 163.

[4] Ibid., December, 1904, p. 175.

[5] Centralblatt f. Chir., 1905, vol. xxxii. p. 302.

Sarcoma of the Soft Parts. The finding of a subcutaneous or intermuscular sarcoma on the extremities is by no means rare. Although I have discussed this subject in detail[1] I think it should be referred to again to aid me in emphasizing the points that I am anxious to convey in the diagnosis and treatment of these tumors. Sarcomata vary in their malignancy. For the less malignant variety amputation is unnecessary, except when the complete local resection of the tumor would leave a limb without function. In the more malignant variety metastasis takes place so early that amputation should only be resorted to when the tumor, on account of its size or ulceration, gives sufficient discomfort to justify the procedure. These tumors, when they cannot be recognized clinically, can be, when they are exposed at the exploratory incision. There are no observations in the literature, or in my own experience, as far as I can find out, which would indicate that there is any danger in exploring such a tumor to allow a naked-eye diagnosis, provided operative intervention follows at once. As a matter of fact the very malignant lymph- and hæmangiosarcomata produce metastasis so clearly that, even though exploratory incision into the cellular soft tumor produced dissemination, it would not do harm, because dissemination has already taken place. In the less malignant tumors, the different forms of round-cell and spindle-cell and the fibrospindle-cell, the possibilities of metastasis are so slight that I doubt if an exploratory incision increases them. One, however, must be prepared to recognize the nature of the tumor by its naked-eye appearance. As a matter of fact, this is not difficult, and, as I stated before, I have never met with such a tumor in which, if there were any doubt, the frozen section threw any more light on the subject. On the other hand, even to the experienced eye, a wrong conception of the nature of the disease may be given by the frozen section. Recently, at an exploratory incision for enlarged prostate, the operator was in doubt as to whether the hypertrophy was benign or malignant; a piece was removed for frozen section and a report of carcinoma immediately returned. Fortunately the general condition of the patient contraindicated the extensive resection necessary for the complete removal of a carcinomatous prostate. The usual enucleation was performed. The patient recovered. Microscopically, from properly hardened and stained sections, there is not the slightest evidence of carcinoma. If this patient had been in good condition, and the operator had placed reliance on the frozen section, an unnecessary mutilating operation would have been performed.

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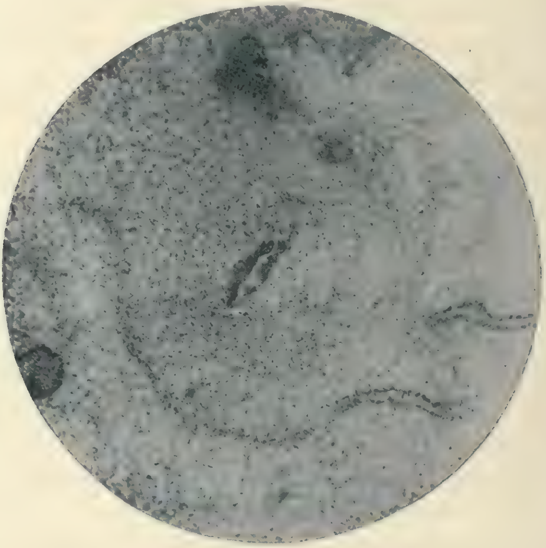
[1] Progressive Medicine, December, 1903, p. 165; Ibid., p. 176.

In doubtful cases of breast tumors in which the disease is senile parenchymatous hypertrophy,[1] the frozen sections resemble so closely carcinoma that a mistake would often be made if any dependence were placed upon them.

The following observation of Dr. Finney again illustrates this point: *Pathological No.* 6026. Sarcoma of the soft parts. Intermuscular perithelial angiosarcoma of the thigh. Female, aged twenty-eight years, trauma six months, tumor two weeks.

In this patient the rapid formation after a traumatism of an infiltrating tumor in the thigh suggested a sarcoma of relatively high malignancy.

FIG. 35



Myositis ossificans could be excluded by the softness of the swelling and the absence of a bone shadow in the muscles in the x-ray negative. At the exploratory incision by Dr. Finney he recognized, from the diffuse growth, and the soft cellular character of the tissue, that he was dealing with a sarcoma of the most malignant variety. The tumor only was excised to relieve the patient of pain. The wound healed per primam, and for the few months that she lived she suffered no mutilation and was relieved of the local discomfort. The gross pathology of this cellular, soft, hemorrhagic tumor which looks something like brain substance is illustrated in Plate IV., Fig. 1. Having seen such a tumor once, one would hardly fail to recognize it again. The microscopic appear-

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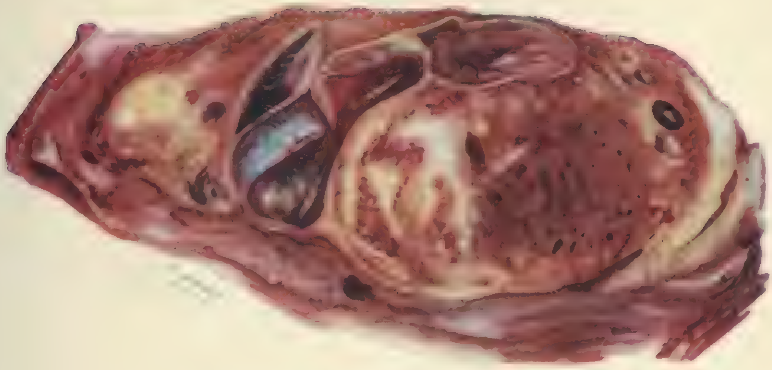
[1] See Warren, Journal of the American Medical Association, July 15, 1905, vol. xlv. p. 160.

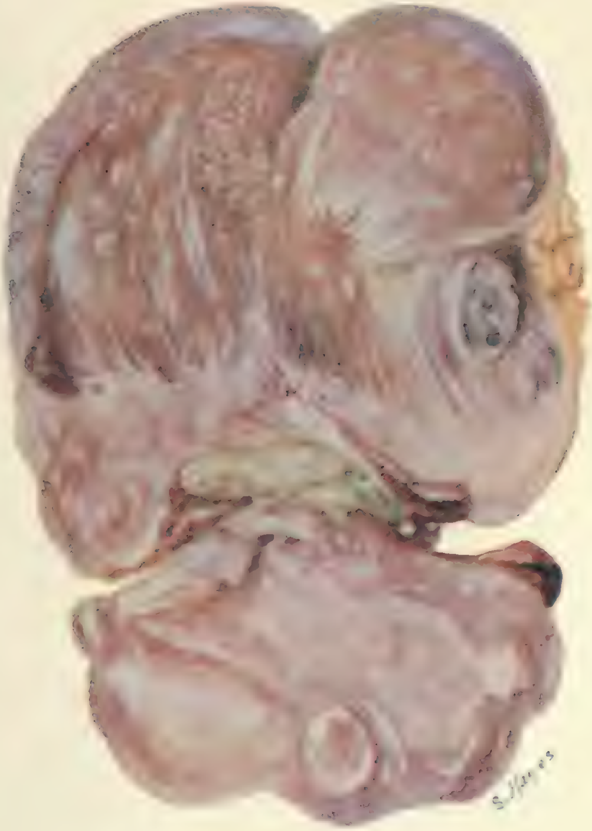
PLATE IV.

FIG. 1.



Sarcoma of the intermuscular tissue.

FIG. 2.



Sarcoma of the leg.

ance is shown in Fig. 35, a round-cell sarcoma arranged about blood-vessels.

In contrast to the above case, which is an example of the most malignant type of sarcoma, the following case illustrates a tumor of relatively low grade of malignancy:

Pathological No. 6207. Sarcoma of soft parts. Spindle-cell and round-cell fibromyxosarcoma, arising from the sheath of the popliteal nerve. White female, aged thirty-six years. Pain four years; tumor eleven months. Two exploratory incisions before admission to the hospital. Amputation of the leg because of local infiltration of the tumor.

This patient was treated for rheumatism because of the pain referred to the knee. The tumor appeared in the popliteal space eleven months ago; it grew slowly and was painless. Three months and six weeks ago an exploratory incision was made into the tumor. The first incision healed, the second remained as a sinus. Since these exploratory incisions the tumor has grown rapidly. It occupies the entire popliteal space. The leg below is œdematous. At the exploratory incision by Dr. Halsted under an Esmarch he was quite convinced that a local extirpation of the tumor would have required ligation of the popliteal artery and vein, and perhaps division of a branch of the popliteal nerve. (This surmise proved to be correct at the pathological examination.) For this reason the leg was amputated in the thigh. The longitudinal incision exposes the femur, the white infiltrating tumor which one can see extends to the capsule of the knee-joint and the muscles of the leg beneath. Plate IV., Fig. 2, represents the naked-eye appearance of the fresh-cut tumor, and one can see that it is much more fibrous and less cellular than the previous case. Microscopically it is composed chiefly of spindle cells which show a tendency to form fibroblasts and fibrous tissue in a myxomatous stroma. The cellular areas are chiefly situated about the sinus left by the exploratory incision, which was lined with granulation tissue.

The prognosis is good. Such a tumor can be removed by local excision, and I am quite confident that if this tumor had been attacked properly at the first exploratory incision three months before she came to the clinic the limb would have been saved. This case is the malignant counterpart of the benign prototype illustrated in Plate I. and Fig. 28, a fibromyxoma of nerve sheaths.

In the experience of the laboratory we have had one benign fibromyxoma of the popliteal nerve, a colored man, aged forty-two years; tumor six years, very large, who has remained well eight years since the excision of the tumor. As the neoplasm was only adherent to the nerve, the nerve did not require resection.[1]

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[1] Progressive Medicine, December, 1903, p. 172.

In a second case operated upon by Cushing the patient was a female, aged twenty-three years. The symptoms, which had been present one year, were all referred to the foot. She was treated for flat-foot. As this treatment failed she was sent to the surgical ward. At the examination a tumor was felt in the popliteal space, and there were motor and sensory disturbances indicating involvement of the popliteal nerve (similar to Custodius' case, a fibromyxoma of the peroneus nerve). At the operation Cushing was able to resect the tumor, but it was necessary to divide the sciatic nerve as it passed through the tumor. Histologically this tumor was much more cellular than the previous case. One year later there was local recurrence in the stump of the sciatic nerve. Amputation was done. This patient, however, has remained well and free from any symptoms of internal metastasis or local recurrence two years and six months since the second operation. This latter case emphasizes the fact that we are justified in attempting to remove tumors of this character by resection rather than amputation, even if we do run the risk of a local recurrence.

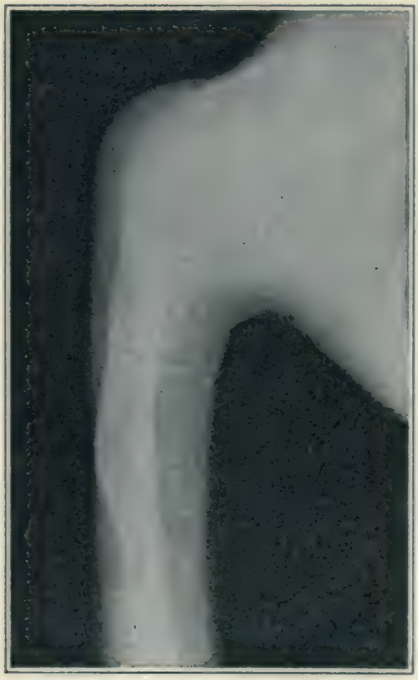
Fig. 36

There is no recent literature on tumors in this group. The two articles on this subject which I have read with the greatest interest are by

Kaposi[1] and Burkhardt.[2] The former, reporting an interesting case of lymphangiosarcoma, discusses the literature; the latter summarizes the experience of Schönborn's surgical clinic in Würzburg on sarcoma and endothelioma.

Benign and Malignant Bone Tumors. BENIGN BONE CYSTS OF THE LONG PIPE BONES. The case of a bone cyst of the upper end of the humerus cured by curetting, which I reported in PROGRESSIVE MEDICINE for December, 1903, p. 191, was examined again a few days ago (September, 1905), now over two years since the operation. Fig. 36 shows that there is no deformity, except the scar; function of the arm is unimpaired. Fig. 37 shows that there is very slight curvature of the humerus but no positive evidence of cyst formation.

FIG. 37



The patient operated on by Dr. Halsted[3] has also remained free from recurrence over one year. This case was of special interest, because the medullary cavity of the femur exhibited in addition to the cyst areas of ostitis fibrosa and cartilage. Drs. Corson and Beck[4] have both written me that their patients have remained free from recurrence.

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[1] Beiträge zur klin. Chir., 1901, vol. xxx. p. 139.

[2] Ibid., 1902, vol. xxxvi. p. 1.

[3] PROGRESSIVE MEDICINE, December, 1904, p. 183.

[4] Ibid., December, 1902, p. 154; Ibid., December, 1903, p. 190.

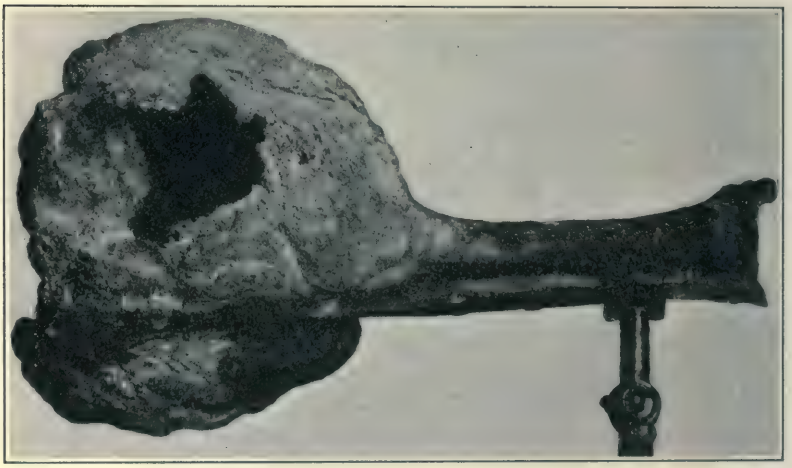
My letters addressed to Dr. Koch and the other German surgeons who have reported cases of bone cysts have remained unanswered.

Dr. Codman's patient[1] has remained well.

Dr. Goldthwait, of Boston, was good enough to send me prints of the *x*-ray studies in his case of multiple bone cysts associated with osteomalacia. As these pictures so closely resemble those of Heineke,[2] which I have reproduced it is unnecessary to repeat them.

Since 1904 two new cases have come under my observation. One I found in the museum of the University of Buffalo; it had been there a number of years, and there were no clinical data. Dr. Roswell Park, with great courtesy and kindness, had the specimen photographed and *x*-rayed. Fig. 38 is a photograph of the dried specimen and shows a large, bony expansion of the upper end of the tibia; the surface, both outside and inside, of the osseous wall, is irregular. There are only two possibilities to explain this bone cavity—a medullary giant-cell sarcoma, or a benign bone cyst. The latter is more probable, because, as a rule, when a giant-cell sarcoma has reached this size it would not expand the bone so abruptly from the lower portion of the shaft, and it, without much doubt, would have broken through the bone capsule at some point. Fig. 39 is an *x*-ray of the specimen. This resembles closely that made from the patient operated upon by Follis[3]—a huge bone cyst of the lower end of the femur.

Fig. 38



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[1] Progressive Medicine, December, 1904, p. 185.

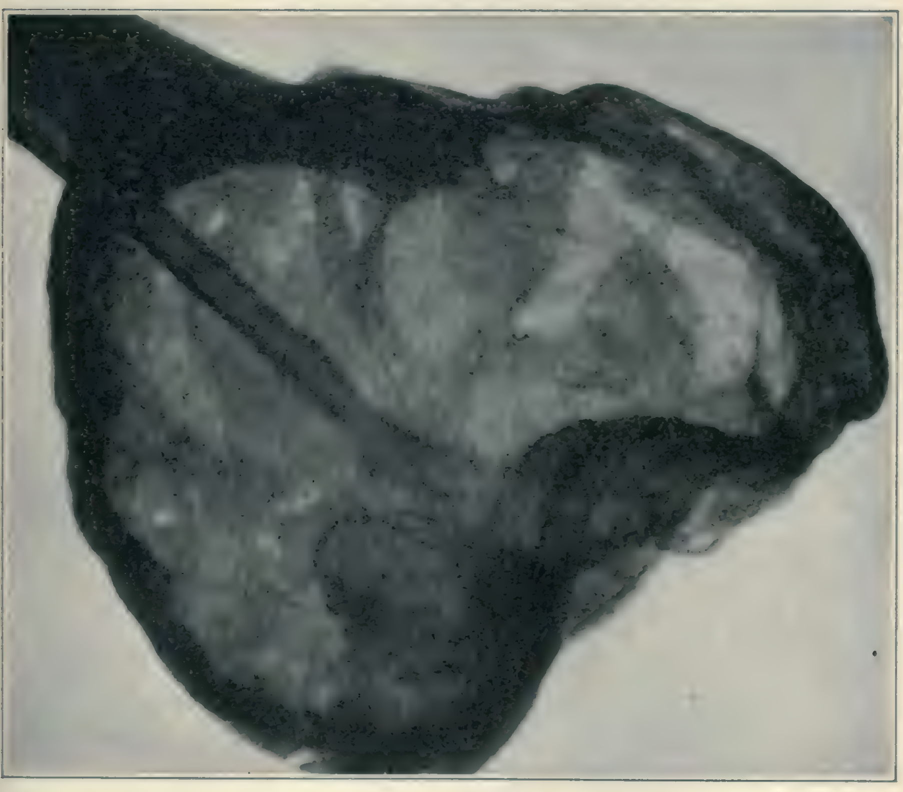
[2] Ibid., p. 187.

[3] Ibid., p. 182, Fig. 40.

The following patient was operated on by Dr. Finney in Dr. Halsted's clinic:

Pathological No. 5644. The patient was a white male, aged eighteen years, who, nine weeks ago, felt pain on motions at the elbow; three weeks later he observed a swelling of the lower end of the femur; for the last three weeks there had been slight redness of the skin and fever. At the examination there was an irregular swelling of the lower end of the humerus with œdema of the soft parts, redness of the skin, and fever. The forearm was held flexed at right angle, and attempts at motion gave pain. At the operation the lower end of the humerus had been expanded, in many places the bony capsule was destroyed, and there had been a rupture into the elbow-joint. The cavity was filled with a hemorrhagic granulation tissue, a blood-stained fluid, and attached to the thin shell of bone there was fibrous tissue. The diseased tissue was removed with the curette only. The wound was packed and healed by granulation. I examined this patient the other day, one year since operation: there is

Fig. 39



no evidence of recurrence; the elbow is ankylosed, and the forearm in a flexed position. Microscopically, the bone shows absorption with numerous giant cells in the lacunæ; the fibrous tissue adherent to the bone resembles that described in Dr. Halsted's case, that is, it gives a picture of ostitis fibrosa. I am inclined to think that in this bone cyst there was a secondary infection. Unfortunately no cultures were taken.

This subject of bone cysts has again been considered with reference to all the German literature by Haberer[1] from von Eiselsberg's clinic in Vienna. He reports 2 cases with photographs of the patients, excellent *x*-ray studies and one microscopic sketch. In one patient there were cysts in the right lower jaw, right parietal bone and left femur in a boy, aged ten years; tumors of seven years' duration. It is interesting to note that after the cyst in the lower jaw had been observed two years, there was a fracture after a trauma which healed. Two years later there was a fracture of the right femur after a slight trauma which healed with deformity. The *x*-ray illustrations do not differ from those which I have reproduced. Small pieces of the tissue from the parietal and femoral tumors were removed, which, when studied histologically, Haberer considered as typical pictures of osteoid sarcoma, and remarks that we have in this case clinically a typical benign bone tumor, yet histologically a malignant one. I cannot take space to discuss his histological description, but I am impressed with the fact that he has found difficulty in interpreting an inflammatory cellular connective-tissue growth which is always present in the walls of these bone cysts, and may be described as ostitis fibrosa. The interpretation of the histological picture in bone lesions is in many cases much more difficult than the recognition of the benign or malignant character of the lesion by the naked-eye appearances. In his second case no operation was performed. The cyst was situated in the humerus and during a period of three and a half years there were three fractures, all of which healed.

Von Mikulicz,[2] in the discussion of this paper, describes an observation of his own in which, for a large cyst in the upper end of the humerus, he made a small incision and injected the cavity with iodoform-glycerin; the closed wound healed per primam. Two years later the *x*-ray demonstrated that the cyst cavity was filled with solid bone. Three years later the boy was still well. As the histological examination of the piece excised from this case resembled that in Haberer's, one can be quite confident that the lesion is not malignant. This observation of von Mikulicz also teaches us that extensive operative intervention is unnecessary. In my own case, also a cyst in the humerus, I simply opened the

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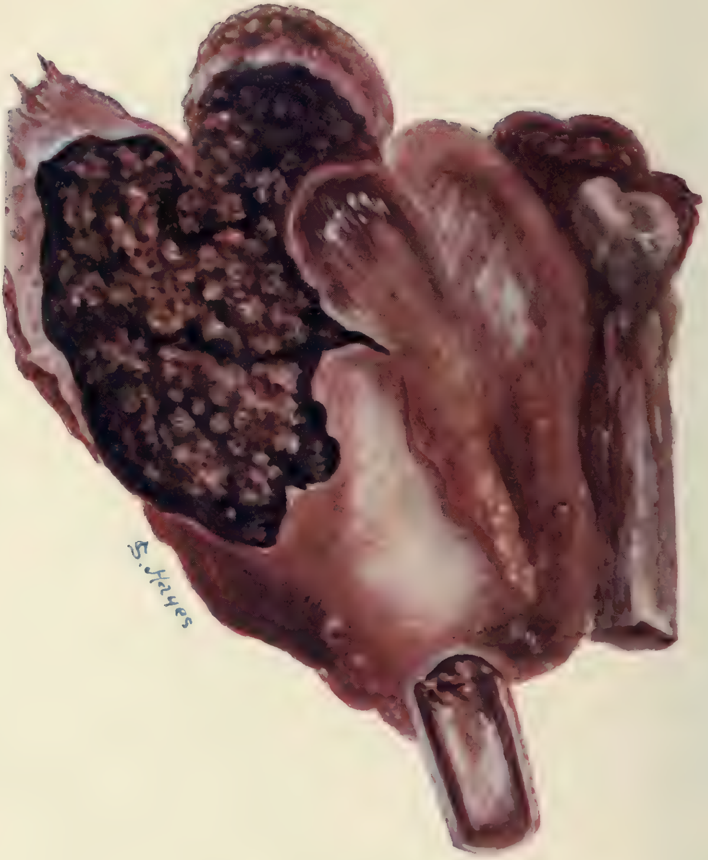
[1] Archiv f. klin. Chir., 1905, vol. lxxvi. p. 559.

[2] Centralbl. f. Chir., 1904, vol. xxxi. p. 1323.

PLATE V.

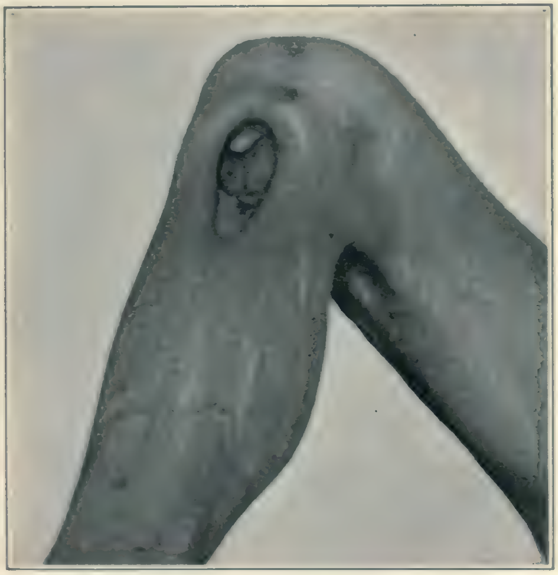


Giant-cell sarcoma of bone.

bone cavity and put in a small piece of gauze, after curetting and allowing the cavity to fill with blood.

GIANT-CELL SARCOMA OF BONE. The case of medullary giant-cell sarcoma of the upper end of the tibia, which I reported with illustrations in 1903,[1] was examined a few days ago; it is now two years and nine months since operation; the bone cavity is almost covered with epithelium; there is no evidence of recurrence; the function of the limb is unimpaired. Fig. 40 is a photograph of the result taken about one year ago. One will note that the upper portion of the bone cavity is still uncovered by epithelium; at the present time this ulcer is very much smaller.

FIG. 40



The other cases of giant-cell sarcoma observed in Prof. Halsted's clinic, mentioned and briefly discussed at that time, have all been heard from within a few weeks. All the patients are well and free from symptoms of recurrence.

Since 1903 only two further examples of giant-cell sarcoma have come under my observation. One, a patient of Dr. Halsted, in whom the tumor was situated in the lower end of the radius; the other, a patient of Dr. Finney, in whom the tumor was situated in the lower end of the tibia. I was able to obtain a painting from the fresh specimen in Dr. Halsted's case. I reproduce it here (Plate V.) because no similar illustration has appeared in the literature. Part of the bony capsule has been removed in order to show the characteristic appearance of the medullary giant-cell tumor, which looks like hemorrhagic granulation tissue, in which one can see white and yellow dots and lines. In this instance Dr. Halsted resected the lower end of the ulna and radius, although the medullary tumor at one point had broken through the bone capsule and had infiltrated the surrounding muscle. This infiltrated tissue was also excised.

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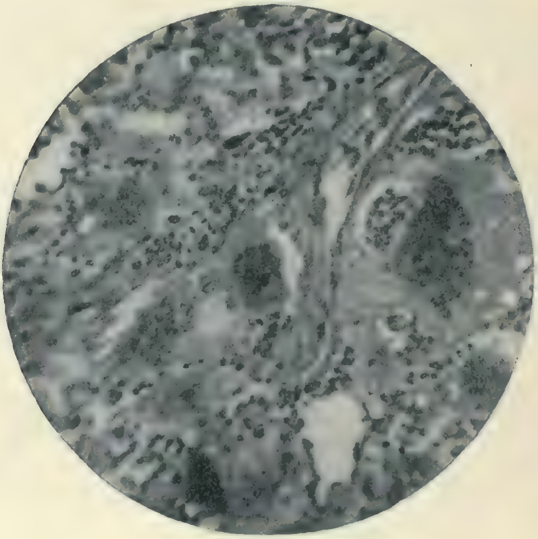
[1] PROGRESSIVE MEDICINE, December, 1903, p. 201.

I have mentioned before[1] a case of pulsating periosteal giant-cell sarcoma of the lower end of the ulna in which the surrounding muscles were infiltrated. In this instance also resection was performed. This patient remained well and free from recurrence for twelve years and has been lost track of since.

Fig. 41



The operation performed by Dr. Halsted in this last case is of too recent date to judge of the ultimate result. The patient was a white male, aged twenty-two years; there had been pain and tenderness in the lower end of the radius for twenty months, swelling for one year. At the examination and from the *x*-ray one could be certain of a medullary tumor producing an abrupt and uniform expansion of the lower end of the radius. I do not think a positive differential diagnosis could have been made between a bone cyst and a medullary giant-cell sarcoma, except this locality is rare for a cyst, and quite common for giant-cell sarcoma. Counting this case, we have had four such tumors in this region. The tumor is shown in Fig. 41. Note the giant cells, some of which are in cavities lined with endothelium, probably capillaries.

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[1] PROGRESSIVE MEDICINE, December, 1903, p. 203.

The best histological study of giant-cell tumors that I have been able to find has been written by George Friedländer.[1] He is inclined to view these tumors as chronic vascular inflammatory processes or benign angiomata, and that the giant cells are produced by the budding of endothelial cells in endothelium-lined spaces. My own observations on these tumors in many instances agree with Friedländer. There is no doubt that these giant-cell medullary and periosteal bone tumors have a very low grade of malignancy.

Mr. Schapiro has been collecting cases from the literature, and as far as this investigation had proceeded, he has been unable to find a single instance of this pure giant-cell tumor which has given metastasis. At least 50 cases have been examined.

The microscopic diagnosis of a giant-cell sarcoma should not be made simply because the tumor contains a few giant cells, nor must all multinuclear cells be interpreted as giant cells. In all round-cell sarcomata large polynuclear cells are almost always found. For this reason I feel justified in criticizing the diagnosis of Farrar Cobb[2] "undoubted giant-cell sarcoma" in his case, in which the patient died of internal metastasis nine months after an interscapulothoracic amputation for a periosteal sarcoma involving the upper portion of the humerus. The pathological report by Dr. Whitney states that the new-growth almost encircled the upper portion of the shaft of the humerus and was 8 cm. in extent and 3 cm. in thickness. The cortical bone showed erosion, and there was apparent extension into the medullary cavity. The circumflex vein was filled with a thrombus of the new-growth which extended to and slightly projected into the axillary vein. Microscopically the tumor was composed of large round cells of irregular shape and size mixed with many multinucleated ones. Diagnosis, "giant-cell sarcoma of periosteal origin with extension into the vein." This microscopic note describes a round-cell periosteal tumor of the most malignant type, one which, in my experience and from the reading of the literature, has always been associated with early internal metastasis. This case also illustrates that in these very malignant tumors no better results are obtained by a very extensive and high amputation than by a less extensive intervention.

Subperiosteal Resection for Medullary Sarcoma. The observation reported by Blecher[3] is one of great importance to those who feel that conservative measures should be employed in certain forms of bone sarcoma. Unfortunately, in this case the microscopic report is so meagre that one cannot be certain as to the exact nature of the neoplasm. Blecher simply states that microscopically the tumor was a "Grosszelliges Sarkom," a large-celled sarcoma; whether he means by this a giant-cell sarcoma for which all previous authorities use the term "Riesenzell-Sarkom," I do not know. The excellent description of the fresh appearance of the tumor, however, impresses me that it was a giant-cell sarcoma. The patient, a male aged twenty-one years, was admitted to the clinic with a fracture in the upper third of the humerus. As there had been pain in this locality for six months, and as the fracture had taken place after a comparatively slight trauma in an otherwise strong young man, and as the crepitus was soft, the possibility of a medullary bone sarcoma was immediately considered. This diagnosis was confirmed by the *x*-ray. At the operation Blecher found a thin shell of bone which, when opened, revealed some dark hemorrhagic fluid and a bone cavity filled with dark-red, soft tissue. As the medullary tumor involved the head of the humerus and the shell of bone in places was so thin Blecher preferred to remove the disease by a subperiosteal resection, including the head of the humerus, rather than a curetting; 14 cm. of the shaft were removed and the periosteal cavity was lightly packed with iodoformized gauze. The arm was treated in extension. An *x*-ray was taken four months after operation. At this time the patient had perfect use of the hand and forearm, but considerable restriction at the shoulder-joint, but no shortening. The function gradually improved and in June, 1905, eighteen months after operation, there was no evidence of recurrence, no shortening, and considerable motion at the shoulder-joint; an arm, therefore, with but slight impairment of function. If this tumor belonged to the malignant variety of medullary sarcoma evidence of internal metastasis would, from our knowledge of these cases, have been present by that time. Therefore, from the gross description and the ultimate result, we can infer justly that the tumor was a giant-cell sarcoma. Blecher is of the opinion that he is the first to advocate subperiosteal resection, and he was rather surprised at the amount and rapidity of the bone regeneration. He is, therefore, not familiar with Nichols'[1] clinical and experimental study of the regeneration of bone after subperiosteal resection, which he advocates, of osteomyelitis. Also, Blecher, in discussing the literature on resection of bone sarcoma, which I presented in detail in PROGRESSIVE MEDICINE for December, 1899, fails to recollect that von Mikulicz and others were dealing with the most malignant varieties of medullary bone tumors and resected the periosteum to give the disease a wider berth. Blecher's observation, however, is important in the treatment of those giant-cell sarcomata which cannot be completely removed by curetting. A pathological knowledge of the more malignant medullary tumors demonstrates the impossibility of removing such tumors by subperiosteal resection.

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[1] Archiv f. klin. Chir., 1902, vol. lxvii. p. 202.

[2] Annals of Surgery, February, 1905, vol. xli. p. 267.

[3] Deutsche Zeitschr. f. Chir., 1905, vol. lxxviii. p. 597.

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[1] PROGRESSIVE MEDICINE, December, 1904, pp. 206–215.

PRACTICAL THERAPEUTIC REFERENDUM.

By H. R. M. LANDIS, M.D.

After considerable delay the eighth decennial revision of the *Pharmacopœia* has appeared, and became official on September 1, 1905.

There are several important points in the new edition which are worthy of attention. These have been published by Hunt and Motter in *Bulletin* No. 23 from the United States Hygienic Laboratory. In regard to changes in terminology, new synthetic remedies have not been admitted under their trade or commercial names, but have been given names which indicate as closely as possible their chemical composition. Thus, *aristol* becomes official as *thymolis iodidum,* showing that it is an iodine compound of thymol; *salol* is now officially known as *phenylis salicylas* indicating the combination of phenol and salicylic acid. Another recommendation for this method of naming new compounds is that not infrequently the same substance is marketed under a number of different names. Failing to obtain any results with one of these preparations, a physician may try in succession several of them, thinking he is using a different drug, when in reality he is prescribing the same thing.

Chemical names have been used as far as possible, and a knowledge of a comparatively few well-known substances will readily show the relations of the new ones to these and how slight the modifications are.

It is not possible to indicate all of the official changes in names. In all 160 changes were introduced. Among the better-known drugs the following changes have been made: Acid carbolicum to phenol; chloral to chloral hydratum; acidum arsenosum to arseni trioxidum; apomorphinæ, cocainæ, hydrastinæ, quininæ hydrochloras to hydrochloridum; hyoscinæ, hyoscyaminæ, quininæ hydrobromas to hydrobromidum; veratrum viride to veratrum. Furthermore, all of the "extracta fluida" have been changed to fluidextracta.

An important reason for using the official names is that frequently the same substance is sold under a registered or fanciful name at a much higher price than under the chemical name.

Another extremely important change is the placing of the preparations of the heroic remedies on a uniform basis. The great majority of the tinctures are now 10 or 20 per cent. in strength; the more powerful ones are all 10 per cent. Tincture of aconite, which was formerly 35 per cent., has been reduced to 10 per cent., and tincture of strophanthus, formerly 5 per cent., has been increased to 10 per cent.

In the matter of additions the Committee on Revision has been very liberal. Recognizing the popularity and demand for certain combinations of drugs, a number of them have been made official and the proportion of their ingredients fixed. This will ensure purity to the physician and cheapness to the patient. No drug or combination of drugs has been admitted to the *Pharmacopœia* on which a patent still exists. The number of extra-pharmacopœial preparations is now so small that there is very little excuse for any one prescribing a non-official preparation. In regard to dosage, the average approximate dose for adults is given. No attempt is made to fix a minimum or maximum dose, and the approximated dose may be exceeded whenever it seems advisable.

The war against patent nostrums and proprietary preparations has continued with increasing vigor during the year. Although the articles bearing on these subjects have been extremely numerous, none of them contain anything new and are devoted mostly to emphasizing the already well-known facts.

The report of the Council on Pharmacy and Chemistry of the American Medical Association is worthy of notice in that it disclosed the fact that many of the remedies advertised under fanciful names are simply mixtures of well-known official drugs, which could as readily be prescribed by physicians and at much less cost to the patient.

In the war against the "patent nostrum" most of the credit must be given the lay journals. Following the lead of Mr. Bok, editor of the *Ladies' Home Journal*, *Collier's Weekly* has instituted a series of articles bearing on this question. The latter journal has also refused to accept any advertising matter from the patent-medicine manufacturers. If all the weekly and daily journals took a similar stand the patent-medicine evil would probably quickly cease without another word being written.

Acetanilid. Owing to the fact that many of the proprietary medicines for the relief of headaches and neuralgia contain as their principal ingredient acetanilid in varying quantities, addictions to the drug are becoming more and more frequent. Two years ago an interesting case of acetanilid poisoning was reported by Stengel and White. Recently the former has had two more cases under observation;[1] in one case addiction to the drug was brought about by a proprietory preparation; in the other the acetanilid itself had been prescribed for the relief of headaches.

D. D. Stewart[2] also records a case in which the acetanilid habit had been formed through the drug having been originally prescribed for nervousness and insomnia.

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[1] Journal of the American Medical Association, July 22, 1905.

[2] Ibid., June 3, 1905.

Stengel cites the following points of interest in these cases: first, the question of diagnosis is important, as they are not infrequently looked upon as instances of some obscure vascular disturbance; second, the denial by the patients of the use of the drug, not because of fear of the drug being withdrawn, but probably because of a moral disturbance; third, the readiness with which the neuralgic symptoms were controlled after the drug had been withdrawn. He believes that the continued use of the drug so lowers the vitality of the patient that instead of having a normal controlling influence on the neuralgia it acts as a depressant, and consequently the neuralgic symptoms occur more frequently than would otherwise be the case.

Polycythæmia, which was present in one of Stengel's cases, leads him to believe that some of the cases of chronic polycythæmia with cyanosis and enlargement of the spleen may be instances of acetanilid poisoning. A case reported by Cabot was also associated with polycythæmia.

The Council on Pharmacy and Chemistry of the American Medical Association, after an investigation of many of the common "headache" preparations, found that they contained from 43 to 76 parts of acetanilid. Clark[1] warns against the use of these proprietary preparations, which are constituted principally of acetanilid and sodium bicarbonate, as being dangerous to a lamentable extent, as soda is not a corrective of the dangers of acetanilid. While Clark believes that the value of acetanilid has been overestimated, it has four distinct therapeutic uses—viz., anodyne, antipyretic, sudorific, and slightly soporific. For *headaches* of the persistent type, such as sick, nervous, bilious, or periodic, acetanilid in 3 to 5-grain doses, combined with caffeine (1 gr.) and bicarbonate of soda (5 to 10 gr.), gives excellent results. Clark calls attention to the fact, however, that caffeine alone or one of the bromides will often produce similar good results. For *gastralgia* or acute attacks of *indigestion* acetanilid (3 to 5 gr.) and bicarbonate of soda (5 gr.) sometimes prove successful, and equally often fail. For "breaking of a cold," acetanilid (5 to 6 gr.) followed by a hot foot-bath and a draught of hot lemonade or hot whiskey is much superior to quinine, and equally efficacious as Dover's powder, without the disagreeable after-effects of the latter.

While acetanilid has the power to reduce temperature, and was much used for this purpose at one time, it is not safe for this purpose and should never be so employed. Clark speaks of its use in *influenza* because of its ability in establishing a reaction through its sudorific powers. He administers 5 to 10 gr., according to the age and conditions, every two or three hours until free perspiration is established. Should no perspiration occur after the fourth dose it is discontinued, and, when resumed, is to be repeated at longer intervals. Acetanilid is sometimes employed in small doses for the relief of the pains in influenza. I should hesitate to use it in the doses recommended by Clark, because its depressing effect is considerable; and such an effect is distinctly undesirable in influenza.

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[1] Boston Medical and Surgical Journal, November 17, 1904.

As a soporific it is of slight value, but is much less useful than the opiates. Employed externally, acetanilid acts aseptically and antiseptically. Clark claims that acetanilid is equally as efficient as iodoform, and has the additional advantage of having no odor. In the treatment of *varicose leg ulcers* it is especially useful.

Acetozone. This drug was most enthusiastically commented on two years ago in the treatment of *typhoid fever*. Llewellyn[1] has recently used the drug in typhoid fever, and although the number (18) of cases treated by him is too small to draw any far-reaching conclusions, his results are in agreement with previous observers. He administered the acetozone as follows: Thirty grains of acetozone were dissolved in three or four pints of water and administered every twenty-four hours in doses varying from a wineglassful to a half-tumblerful of water with a little lemon-juice added. Owing to the bulk of water taken the amount of milk was reduced to two pints daily, reinforced with a tablespoonful of raw beef-juice. Under its use general improvement was noted in twenty-four hours and convalescence began in all but one instance on or before the fourteenth day. The temperature began falling in thirty-six to forty-eight hours after the drug was started and usually dropped 1° a day until the normal was reached. In two instances the fall in temperature was noted as early as the twelfth hour; in one it was delayed until the fourth day.

The acetozone produced marked diuresis and quickly relieved *tympanites* if present when the drug was started; otherwise the tympanites did not develop. Hemorrhage did not occur in any of the cases, and in all of them the tongue remained moist and free from coating. As acetozone has a tendency to produce constipation, sodium sulphate was used to counteract that condition.

Used as a spray in the treatment of affections of the trachea and lower air passages, J. J. Kyle[2] uses acetozone in a solution of inorganic oil. The following formula is recommended:

Acetozone crystals	gr. viiss (0.5 gram).
Chloretone crystals	gr. viiss (0.5 gram).
Refined bland mineral oil	f℥iij (99.0 grams).

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[1] Australasian Medical Gazette, February 20, 1905.

[2] Therapeutic Gazette, November 15, 1904.

Ford[1] has found acetozone of value in general surgery. Owing to its germicidal properties it is useful in *suppurative conditions*. Ford employs the acetozone in the same manner and in the same conditions that hydrogen peroxide is used. For the treatment of *fistulous tracts* 5 to 10 gr. of the acetozone are dissolved in 6 to 8 oz. of warm water and injected with a glass syringe. After allowing the solution to stay in contact with the tissues for a few minutes it is washed out with distilled water. Ford has also employed acetozone in an irrigating fluid, using 15 gr. to two quarts of water.

It may be noted here that *hydrogen peroxide* should never be used when the external opening of a fistula or abscess cavity is small. Under these circumstances the small opening does not allow of the free escape of the resulting chemical reaction, and the surrounding tissues are consequently subjected to marked pressure and the infection farther spread.

Adrenalin. Much of the literature on this subject has been covered by Ewart in the September number of PROGRESSIVE MEDICINE, pp. 84 and 90. Owing to the very extensive use of adrenalin I do not think too much publicity can be given to several facts, as there is reason to believe that more caution is needed in the administration of this substance than has hitherto been displayed. Coplin[2] in some experimental work with rabbits found that marked arterial degeneration was produced by repeated doses given for a long period of time in the animals from the intravenous use of adrenalin. In one of the animals a dissecting aneurysm involving the greater part of the aorta was produced. Another marked feature of these experiments was the occurrence of œdema of the lungs. Loeb stated in the discussion of Coplin's paper that he had observed similar changes. Marchand (quoted by Ewart) records similar findings as to the arteries. As was pointed out last year the dose of adrenalin is still unsettled, and nothing has appeared during the past twelve months to indicate the safe maximum dose. Therefore, in view of the experimental work so far recorded considerable caution should be exercised when giving adrenalin internally. Floersheim[3] has reviewed the various uses to which adrenalin has been put and Hildebrandt[4] has contributed an article on its application in surgery. Both these writers caution against the subcutaneous use of adrenalin even in high dilutions, because of the danger of sloughing and gangrene. According to Floersheim the hypodermic use of adrenalin is unnecessary, as a few drops placed on the tongue will produce an apparent action by the time a syringe can be gotten ready.

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[1] Therapeutic Gazette, January 15, 1905.

[2] Proceedings of the Pathological Society of Philadelphia, May, 1905.

[3] Medical News, April 1, 1905.

[4] Berliner klin. Wochenschrift, January 2, 1905.

Kaplan[1] has obtained good results with adrenalin in *asthmatic attacks.* He does not claim to cure the disease by the use of adrenalin, but states that used hypodermically it will usually cut short an asthmatic seizure in less than five minutes. The cases most benefited are those of bronchial asthma associated with emphysema. In long-standing cases the ordinary dose is not sufficient, and as much as 25 or 30 minims must be given. Even with large doses Kaplan never noted the occurrence of glycosuria, and he believes that the contraindications to the drug are overestimated. Thrush[2] has reported a series of 10 *typhoid* cases in which hemorrhage occurred. He ascribes the good results obtained in these 10 cases to the use of adrenalin. The drug was administered in 20 minim doses every three hours.

Schlesinger[3] reports 2 cases of *gastrointestinal hemorrhage* treated with adrenalin. In 1 case, a hæmophilic, 6 minins of a 1:1000 solution were given every hour until the bleeding ceased. In twenty-four hours this patient took 7 dr. of the solution.

It would be interesting to know the condition of the arteries in the cases reported by Thrush and Schlesinger.

Menger[4] used adrenalin in a man bitten by a moccasin snake. The bite was on the dorsum of the right foot, and a ligature had already been applied about the ankle when Menger first saw the patient. The foot was markedly swollen, and there was in addition marked pallor and a slow, almost imperceptible pulse. Twenty-five drops of *permanganate of potash* (2 to 4 gr. to the ounce) were injected into the fang wounds, and a little later 20 drops of adrenalin (1:1000) were injected into the tissues about the wounds. A piece of cotton saturated in permanganate solution was placed over the fang wounds and the ligature loosened. The pulse improved almost at once. Two hours later 10 drops more of adrenalin were injected with ¼ gr. of morphine to secure rest. Seen the following day the man was greatly improved and there was no swelling extending upward, as usually occurs in cases not treated with adrenalin. The potash is probably responsible for the good results.

Alcohol. The true status of alcohol in medicine remains as far from being settled as ever. The vexed question as to its food value has received no light during the past year. Goddard,[5] from experimental observations, concludes that in small doses alcohol is undoubtedly a food, but that when administered in large doses about 50 per cent. of it is excreted from the system, and that under these circumstances all of it is not a food.

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[1] Medical News, May 13, 1905.

[2] Therapeutic Gazette, December 15, 1904.

[3] American Journal of the Medical Sciences, July, 1904.

[4] Texas Medical Journal, January, 1905.

[5] Lancet, October 22, 1904.

Chittenden,[1] on the other hand, does not regard it as a food product in the true sense of the word. He admits, however, that when taken in moderate doses it can be oxidized in the body, and that given to a patient in whom tissue waste is excessive alcohol lends itself to the combustion processes and so saves the tissues.

Although formerly much employed in the acute infections the use of alcohol in more restricted at present. Peabody[2] believes that the use of alcohol is called for in cases of high, persistent temperature, with delirium, nervous prostration, with a pulse rapid and easily compressible and dicrotic or irregular. When the tongue becomes less dry, the delirium diminishes, and assimilation improves the use of the alcohol should cease.

It has long been believed that alcohol was a very potent factor in the production of *arteriosclerosis*. Cabot,[3] however, from clinical and post-mortem observations, finds that this statement is greatly overestimated. He found but a small percentage of cases of arteriosclerosis in which the contributing factor seemed to be alcohol.

In last year's review I quoted Major Fribig's[4] experience in regard to the use of alcohol in the tropics. His report seemed to be conclusive as to its evil effects. Within the past year, however, Woodruff,[5] as the result of extensive observations in the Philippines, states that the use of alcohol in the tropics is necessary for the preservation of good health.

MacNicholl[6] has examined 55,000 school children in an investigation as to the relation of heredity to mental deficiency. He found that a large proportion of children with an hereditary alcoholic taint were dullards, very deficient, or suffered from some neurosis or organic disease.

Walko[7] recommends alcohol as a local application. Most of his patients suffered from *erysipelas, tuberculous peritonitis,* or *appendicitis*. He employed 50 per cent. alcohol in some cases and 96 per cent. in others. The alcohol is applied as follows: The alcohol is poured on gauze folded in eight layers. The gauze is covered with a piece of flannel and an ice-bag is placed over the flannel. A compress of 96 per cent. alcohol is well borne by the skin, but only when it is covered with flannel instead of wax-paper, as the latter excludes the air. If the skin is very tender, as in young children, thin compresses of two layers should be employed, and in every case the flannel should be covered with an ice-bag. Walko states that in addition to its pain alleviating and resorptive action the alcohol succeeded in many cases in aborting abscess formation.

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[1] Medical News, April 22, 1905.

[2] Medical Record, March 4, 1905.

[3] Journal of the American Medical Association, September 17, 1904.

[4] PROGRESSIVE MEDICINE, December, 1904.

[5] Medical Record, December 17, 1905.

[6] Quarterly Journal of Inebriety, April, 1905.

[7] Berliner klin. Wochenschrift, February 13, 1905.

Brugger[1] also speaks well of this method of using alcohol. He directs that the dressings should be kept moist, but not wet, and should be changed once in twenty-four hours.

WOOD ALCOHOL.[2] As formerly employed in the arts, this substance was also known as wood spirit, wood naphtha, Columbian spirit, etc. Owing to its evil odor and nauseating taste no one was able to drink it, and its use as an adulterant could easily be detected. Several years ago it was found that it could be deodorized and rectified, and dating from this discovery it has been largely used to adulterate whiskey, and other articles containing large amounts of alcohol, as flavoring extracts, tinctures, Jamaica ginger, bay rum, cologne-water, witch-hazel, as well as all kinds of official domestic and proprietary medicines. With startling rapidity there has also been an increasing number of deaths and cases of partial or complete blindness charged up to its account. In this country wood alcohol began its evil career as recently as 1896, while in Russia not a single case of death or blindness occurred from its internal use until 1904, although in the latter country its use in varnishes, for burning in spirit lamps, and for other manufacturing and household purposes was widespread.

While the evil effects of wood alcohol are most often noted after its internal use, blindness and even death may result from the inhalation of the fumes. In manufactories where this form of alcohol is extensively used it is customary to admit a great deal of fresh air into the work-rooms in order to prevent accidents.

The fatal dose of wood alcohol is probably between 4 and 8 ounces, although complete optic nerve atrophy has been known to follow the ingestion of from 2 to 5 drachms. Small amounts frequently taken are particularly dangerous, and this fact constitutes one of its greatest dangers, because preparations containing it are usually taken in much the same way as preparations of grain alcohol—*i. e.*, in small amounts and at frequent intervals, so that it not unusually happens that a pint or even a quart has been taken and with a fatal result. A very thorough study of the literature relating to wood alcohol poisoning has been made by Buller and Wood.[3]

A case of complete blindness, transitory in character, due to wood alcohol, has been reported by Kaller.[4]

Three cases of *neuritis* following wood alcohol poisoning have been reported by Jelliffe.[5] He states that he was unable to find similar cases reported in the literature.

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[1] Deutsche med. Wochenschrift, February 16, 1905.

[2] Editorial, Journal of the American Medical Association, 1905.

[3] Journal of the American Medical Association, October 22, 1904.

[4] Medical Record, July 1, 1905.

[5] Medical News, March 4, 1905.

Wiley[1] states that the effects produced by methyl alcohol in any of its forms are such as to justify its classification among the poisons.

Maryland has taken steps to prevent the evil by passing laws in 1904 which provide under penalty that no person, firm, or corporation engaged in making, compounding, and selling extracts, essences, or other fluids commonly used for flavoring articles of food or drink shall use or permit to be used by employees in the manufacture of such extracts, etc., any methyl or wood alcohol; nor shall any person, etc., sell or offer for sale any such extract, etc., containing any methyl or wood alcohol.

Amyl Nitrite is another drug recommended for the control of *hæmoptysis.* Francis Hare[2] has used the drug with alleged good results. Its good effects are ascribed to the sudden lowering of the peripheral resistance and to the reduction of the blood pressure in the pulmonary circulation. This latter phenomenon is caused indirectly by a fall in the blood pressure in the left auricle, due to diminished resistance in the aortic outflow. It is believed that the bleeding is stopped by the formation of a plug during the very sudden fall in the blood pressure.

Rand[3] gave the drug a trial in *malaria*, being led to do so because of its action on the peripheral circulation. He gave a 3-minim pearl of amyl nitrite to a patient, with instructions to crush it and inhale the vapor at the onset of the expected paroxysm. This use of the drug will frequently abort the malarial seizure.

Colman[4] used amyl nitrite successfully in a case of *menorrhagia.* When menstruation started Colman ordered the patient to bed, and when the bleeding exceeded the normal 3 minims of the drug were inhaled.

Antidiphtheritic Serum. The literature on this subject has been quite extensive during the past year, and although nothing new has appeared certain points have been emphasized and will well bear repetition. McMahon[5] calls attention to certain points in which physicians are remiss in the treatment of diphtheria. In the first place the throat should always be examined in every case of acute illness in children. Too frequently this is neglected, and by the time the error is recognized the case may be hopeless. "Always examine the throat of a sick child, no matter what the symptoms are." A second, and even more frequent, source of error is failure to recognize the gravity of the throat symptoms. In either case valuable time is lost in the administration of the antitoxin, and in addition others are needlessly exposed to the dangers of diphtheria. Much trouble would be avoided if the following rules were observed: 1. In every case in which there is a suspicion of diphtheria, give antitoxin at once and freely. 2. Get a report in every doubtful case, but do not wait for the report; inject at once. 3. If the bacteriological examination shows the presence of diphtheria bacilli, give an injection to all children to prevent spread of the infection. Every physician takes pride in the correctness of his diagnoses, but in throat conditions the danger of being too sure are so serious that it is much better to always take the safe side and give antitoxin. I believe that the mortality of diphtheria would be considerably reduced if the term "tonsillitis" were entirely dispensed with.

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[1] New York Medical Journal, November 26, 1904.

[2] Lancet, October 1, 1904.

[3] American Medicine, April 29, 1905.

[4] Scottish Medical and Surgical Journal, 1905.

[5] Canadian Practitioner and Review, 1904.

Nash[1] also calls attention to the importance of treating all suspicious cases as though they were undoubtedly diphtheria. As he states, it is impossible always to diagnose correctly diphtheria in its early stages; other throat conditions, particularly follicular tonsillitis, simulate it in many respects so closely that without a careful bacteriological examination it is extremely difficult to differentiate between diphtheria and several conditions affecting the tonsils. Furthermore, it is not always possible to obtain a competent bacteriological report. This is especially true of those practising in the country or in small communities. And even where the facilities are at hand twelve to twenty hours must elapse before a report can be obtained, and thus valuable time is lost if the report comes back positive. In case a negative report is returned no harm has been done by the administration of antitoxin. If the case is properly explained to the family there need never be any trouble on the score of expense or inconvenience.

Royer[2] has recently contributed a most excellent study on the antitoxin treatment of diphtheria, with a plea for rational dosage in treatment and immunizing. In addition to extensive statistics bearing on the mortality of diphtheria before and since the introduction of antitoxin, Royer also gives data in reference to the day on which the antitoxin was administered. The figures quoted by Royer bear out the well-known fact that the mortality in diphtheria increases in direct proportion to the time which elapses between the first evidence of the disease and the giving of the antitoxin. "Experience has taught me that the golden time for administering antitoxin is during the first twenty-four hours of an attack of diphtheria. I have yet to see a patient die from diphtheria who had antitoxin in sufficiently large doses within twenty-four hours of the commencement of the attack."[3]

In regard to the much-discussed question of dosage Royer gives the following doses in use in the Philadelphia Municipal Hospital: Purely tonsillar exudate (single), 2500 units; purely tonsillar exudate (double),

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[1] Practitioner, April, 1905.

[2] Therapeutic Gazette, April, 1905.

[3] J. H. McCollom, quoted by Royer.

5000 units; tonsillar exudate with involvement of pillars and uvula or pharynx, 7500 to 10,000 units; nasal and any other part involved, 7500 to 10,000 units; laryngeal, 7500 to 10,000 units. The dose is repeated in each case in from twelve to twenty-four hours, depending on the severity of the disease and the signs of improvement, as shown by the general condition and disappearance of the exudate. "If the exudate is rapidly separating, do not give a second dose; where a great amount of exudate remains, give a daily dose of from 5000 to 7500 units until the greater portion has disappeared. With patients admitted after the seventh day of the disease, give 2500 units only. Do not repeat." The extremely large doses in the nasopharyngeal cases are given because the lymphatic supply of this locality is particularly rich.

Royer states that experience at the Municipal Hospital shows that antitoxin is little used as an immunizing agent. He states that it is no uncommon experience to receive a patient ill with diphtheria and in from two to three days receive a second or third case from the same house. If immunizing doses were used much needless suffering and distress would be avoided. He further states that they often have mothers accompany their sick babies and live in the acute wards with them; or mothers, ill themselves, bring with them nursing babies not suffering from the disease; no precaution is taken and no treatment given aside from immunizing doses of the antitoxin. These patients are not expected to get the disease and are practically assured that they cannot get it if immunized.

For purposes of immunization Royer recommends the following doses: 500 units for those not directly exposed, 1000 units for those directly exposed, and 1500 units if any sign of illness is present. He states that he has not yet seen a case of diphtheria develop where a patient had been immunized at the time of exposure or soon after.

Fischer[1] is a strong advocate of large doses of antitoxin. He points out that when large doses of antitoxin are employed the mortality is always lower than when small doses are used. The doses employed by Fischer are similar to those in use at the Philadelphia Municipal Hospital.

Hare[2] in an editorial on the efficient dose of diphtheria antitoxin states that it cannot be measured in cubic centimetres or units, but it must be given for the effect, regardless of the dose. It is also pointed out that children do not require smaller doses than adults, but, on the contrary, often require larger doses, as they are more susceptible to the infection. As an illustration of the enormous amounts of antitoxin which may be given, Hare quotes the report of a case by Dr. Sutherlin in which he gave a woman aged twenty-six years no less than 498,000 units. For three consecutive days she was given 32,000 units daily, or 96,000 altogether. The case is cited as an illustration of the fact that large doses are often required in virulent infections, and also because it serves to show that the serum is harmless even when enormous doses are given.

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[1] New York Medical Journal, June 17, 1905.

[2] Therapeutic Gazette, March 15, 1905.

I think the recent tendency in regard to all the sera is toward their employment as a prophylactic rather than as curative agents. This is notably the case with antitetanus serum. Wesener[1] gives his experience with antitoxin as a prophylactic in nearly 250 cases. Only 4 of the children thus protected contracted the disease; in 3 it developed within forty-eight hours after the injection, showing that it must have been already present. In the fourth case the symptoms and signs were so slight that the diagnosis could not have been made without a bacteriological examination. In his experience the immunity thus conferred lasts from three to four weeks and is not absolute. Wesener gave very small children 200 units and the larger ones from 300 to 400 units. Ibrahim[2] also speaks strongly in favor of immunizing doses of antitoxin in individuals exposed to diphtheria. He found that the immunity thus given lasted three weeks without fail. A dose of 250 to 300 units was found effectual, but in children already suffering from scarlet fever, whooping-cough, or measles 500 units should be given. Inasmuch as age has nothing to do with the size of the dose, and it has been repeatedly shown that the serum is perfectly harmless, the doses recommended by Royer[3] had better be employed. Doubtless Wesener would have obtained absolute immunity in all of his cases had he employed larger doses.

The intravenous administration of diphtheria antitoxin was first suggested by Cairns two years ago, when he reported 20 cases treated in this manner. The method has also been tried in a few cases at the Philadelphia Municipal Hospital. Biernacki and Muir[4] have treated 38 cases in nine months by means of intravenous injections. Although they had a mortality of but 3 out of 38 severe cases, they are in doubt as to the advantage of this method because there had been a diminution in the death rate of diphtheria under their care. The intravenous dose employed by Biernacki and Muir was 20,000 units.

Antitoxin Rashes. Sutliffe[5] has made a study of 123 rashes occurring in a series of 630 cases of diphtheria. He found that the eruption might be macular, urticarial, maculopapular, scarlatinal, or consist of large, blotchy, slightly elevated areas, and that it had a tendency to change in appearance from hour to hour. An important point in regard to these rashes is the presence in nearly all cases of an urticarial element, although it may be very slight and in some instances itching is scarcely noticed. The time of its appearance after the antitoxin injection ranges from a few hours to three weeks or even longer. Preceding the appearance of the eruption there is an elevation of temperature ranging from 100° to even 105°; joint pains and itching of varying intensity may also be present. It was noted that blondes seemed more subject to the rashes than brunettes, and that the rashes in the former assumed a more severe character than in the latter. When the rash assumes a measly type it is to be distinguished from measles by the absence of catarrhal symptoms, Koplik's spots, photophobia, etc. When it is scarlatinal in type the confusion is greater as the resemblance is pronounced, and in addition the association of scarlet fever and diphtheria is not an uncommon one. The absence of vomiting, of the red tongue with enlarged papillæ, of glandular enlargement with tenderness, of circumoral pallor, and the presence of urticaria and lack of the distinct punctate appearance seen in scarlet fever usually suffice to distinguish the two conditions.

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[1] Münchener med. Wochenschrift, March 21, 1905.

[2] Abst. Journal of the American Medical Association, April 29, 1905.

[3] Loc. cit.

[4] Lancet, December 24, 1904.

[5] Therapeutic Gazette, February 15, 1905.

Roehr[1] states that the urticaria, œdema, or arthritis following injections of antitoxin may be prevented by large doses of *potassium acetate* well diluted, and securing free action of the bowels. According to the amount of antitoxin used, 5 to 30 gr. of potassium acetate in a glass of water are given every hour for two to six days or longer. He also states that the disagreeable symptoms may be avoided by small but repeated doses, but that this is possible only when the patient is under constant supervision, and even then is dangerous in infants or laryngeal cases.

Roehr explains the benefits from potassium acetate on the ground that it favors elimination already overtaxed by the foreign serum. An editorial in the *Medical News* (June 10, 1905) suggests that the untoward effects of the antitoxin are produced by the formation of precipitins and that the precipitins cause minute emboli which occlude the capillaries. Experimental work would seem to show that the untoward effects of antitoxin are in some way related to the formation of precipitins, but, as the editorial states, it is difficult to understand why these symptoms, if due to embolism, are of such an evanescent nature.

A recent method of treating *cerebrospinal meningitis* is by massive doses of diphtheria antitoxin. At present the treatment is on trial, and while several observers have reported favorably on its use others are skeptical as to its value. The method was originally introduced by Arthur J. Wolff.

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[1] Chicago Medical Recorder, January 15, 1905.

Waitzfelder[1] reports on 17 cases treated during a period of five weeks. Of this number 5 recovered completely, 3 died, and 9 were under treatment at the time of writing. Of the 9 cases still under treatment 5 showed marked improvement and gave promise of recovering; in the remaining 4 the condition was serious. Hare[2] was impressed favorably with the treatment in a single instance in which he used it. The case was of the fulminating type, and although it terminated fatally the delirium, muscular rigidity, and restlessness showed marked improvement after the administration of the antitoxin. Death resulted from cardiac failure.

Peabody,[3] who used the treatment in 22 cases of cerebrospinal meningitis, states that he could not see any influence for good or evil from the use of diphtheria antitoxin.

Rosenberger[4] and Pennington,[5] considering the antitoxin treatment of cerebrospinal meningitis purely from a laboratory standpoint, are not disposed to consider it favorably. As Rosenberger says, if cerebrospinal meningitis is due to a specific bacterium (meningococcus of Weichselbaum) then a specific serum, an antitoxic or antimicrobic one, should be used in the treatment of the malady. He further calls attention to the fact that when the toxin of the diphtheria bacillus is diffused through the system (if the latter is at par) there is a combination of the toxin with a suitable receptor, and this union brings about the formation of the immune body. If there is no suitable receptor present, then no chemical reaction takes place because the receptor must have some assimilable foodstuff—*i. e.*, toxin. As each toxin according to Ehrlich's theory has its own receptor, it is obvious that the toxin elaborated by the meningococcus of Weichselbaum cannot form a combination with the receptor of the diphtheria toxin. Hamilton[6] says that against other organisms diphtheria antitoxin is neither protective nor curative, and, furthermore, that it is distinctly deleterious, as animals so treated die sooner than those without antitoxin. The dose of diphtheria antitoxin when employed in the treatment of meningitis is from 10,000 to 15,000 units.

In spite of these theoretical objections to the use of diphtheria antitoxin it has within the past few years been used in a variety of affections, with alleged good results. Within the past year it has been recommended by Rowland[7] in the treatment of *hay fever;* by Leggé[8] for *goitre,* and by Passalacqua[9] in the treatment of *whooping-cough.* None of these observers give any explanation of why the antitoxin did good in these diseases.

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[1] Medical Record, March 11, 1905.

[2] Therapeutic Gazette, May 15, 1905.

[3] Medical Record, May 13, 1905.

[4] Therapeutic Gazette, June 15, 1905.

[5] Ibid.

[6] Quoted by Pennington.

[7] American Medicine, December 17, 1904.

[8] Journal of the American Medical Association, April 22, 1905.

[9] Revue francaise de médecine et de chirurgie, March 13, 1905.

Antipneumonic Serum. The status of this serum is as yet in an unsettled state and a definite opinion as to its value cannot be expressed. Pässler[1] used a serum made from several species of pneumococci. He claims that the pneumonic attack was appreciably shortened, the temperature in many cases reduced, and the tendency of the disease to spread to neighboring lobes was less than usual. Furthermore, the general condition of the patients improved and complications were rare. De Renzi[2] gives a favorable opinion of Pane's serum, which he used in 26 cases of pneumonia. According to this observer the general condition of the patient improves after the first injection, the temperature is reduced, the pulse and respirations decrease in number, and vascular pressure is lowered for a few days. No effect on the local condition in the lung was noted. The other side of the case is given by Anders,[3] who concludes from a study of the literature that:

1. A sufficiently extensive trial of the antipneumococcal sera has been made to determine with a reasonable degree of accuracy their efficiency, and the results, as a whole, fail to carry conviction.
2. An efficient serum, or one that will cut short the pneumonic process, is yet to be produced, although according to some clinicians the sera available at present have a restricted field of usefulness.
3. Recent observers have employed the serum in massive doses from the commencement of the disease without gratifying results.
4. The practical results of the use of antipneumococcus serum, as shown by the very slight reduction in the mortality percentage, does not warrant its general introduction.
5. The sera thus far found possess no antitoxic qualities, and their supposed anti-infectious properties have not been proven.
6. Further investigations into the subject with a view to discovering an efficacious serum are to be strongly advised and encouraged.

Castresana[4] is of the opinion that fully 95 per cent. of *corneal ulcers* are the work of the pneumococcus. On this assumption he has been treating ulcers of this class with antipneumococcus serum and claims that a majority of them were promptly cured. The serum was injected under the conjunctiva and also instilled every four hours, supplemented by the usual measures.

Antirabic Serum. In spite of the fact that *hydrophobia* has been known to be a preventable disease for many years, the belief in the necessity of having the prophylactic treatment carried out at an institute, often situated at a great distance from the patient's home, and not infrequently entailing great expense, has in many instances prevented the employment of this procedure. That this is not necessary is shown by two cases reported by M. Solis-Cohen,[1] who carried out successfully the treatment in the patients' homes.

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[1] Deutsches Archiv f. klin. Medizin, 1905, Nos. 3, 4.

[2] La Riforma Médica, 1904; abst. Journ. Amer. Med. Assoc., 1905.

[3] Journal of the American Medical Association, December 10, 1904.

[4] Siglo Medico, January 7, 1905; Journal of the American Medical Association, June 10, 1905.

The Pasteur Institute of the Department of Health in New York will arrange for a course of treatment for the individual case on receipt of the following information: 1. Name and age of the patient. 2. Location of bite, date, and severity of bite, with its treatment. 3. Any information bearing on the diagnosis of the animal inflicting the bite. They also require a brief report on the patient's condition two weeks after the end of the treatment. If no symptoms have developed two weeks after the cessation of all treatment the patient is considered out of danger.

Angny in discussing Cohen's paper stated that he had also administered the Pasteur treatment in a patient's home.

Antistreptococcus Serum. Reports on the curative effects of this serum have been most favorable during the past year. Wolff[2] believes that the best chance of success with the bactericidal sera are from the standpoint of prevention, and that this is particularly true of antistreptococcus serum. In Wolff's opinion antistreptococcus serum should be given during the stage of incubation or when a general streptococcus infection is feared, as after abortion, severe deliveries, etc. This statement is of interest when we call to mind that after years of failure as a curative agent it is in the matter of prevention that tetanus antitoxin has finally proved so successful.

Meyer[3] advocates the securing of an antistreptococcus serum which has been properly standardized. He believes that it should be tested by an expert with a streptococcic culture from human infection in an unchanged state. He furthermore cautions against its use when any of the organs are seriously involved, as harm may be done. This is especially true of acute rheumatism and the malignant form of endocarditis. Meyer obtained his best results with antistreptococcus serum in acute throat affections, where its effect was very marked, and in *diphtheria,* where streptococcic serum was added to the diphtheritic. He also noted improvement in cases of *puerperal sepsis* if the infection had not become systemic.

Foulerton[4] advises large doses of antistreptococcus serum, as he believes the action of the serum is purely antitoxic and that the infecting bacteria remain unaffected by the serum and continue to manufacture their specific toxins. In order to neutralize these toxins which are being continually thrown into the patient's circulation repeated doses of the serum must be given. Foulerton begins treatment with an injection of at least 20 c.c. of the serum and repeats this dose, if necessary, at least once every twenty-four hours. If no improvement is noted after two doses of 20 c.c. each given within twelve hours, it is useless to continue administering it. He does not believe that the toxic symptoms following the use of a serum are of any particular consequence. At any rate, whatever the dangers of large doses may be they are necessary for the successful treatment of streptococcic infection. A dose of 5 c.c. is useless and will doubtless result in failure.

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[1] Proceedings of the Philadelphia County Medical Society, March 31, 1905.

[2] Berliner klin. Wochenschrift, 1904, Nos. 42–44.

[3] Ibid., February 20, 1905.

[4] Lancet, December 31, 1904.

Bumm[1] gives the results obtained in 67 cases of *postpartum infection* treated by antistreptococcus serum. The series gave a mortality of 11 per cent., and included all types and degrees of puerperal infection.

Once the infection has spread beyond its original site and septic complications are produced, no serum so far devised is available to effect a cure, no matter how large the dosage employed. When the streptococci are localized in the endometrium or but sparingly present in the blood, Bumm thinks the serum is likely to act favorably. In his experience the earlier the serum is resorted to, the better are the results.

Rose[2] gives his experience with one case of severe streptococcus infection, in which recovery seemed undoubtedly due to the serum.

Cressy[3] reports a case of sepsis developing after injury to the great toe. On the eighth day of the disease 20 c.c. of antistreptococcus serum was given; within an hour the temperature had dropped 3.5°. During the acuteness of the attack the serum was used in 10 c.c. doses daily. Although the case was complicated by the formation of superficial abscesses, pneumonia, and an empyema, convalescence was rapid and uneventful.

Anderson[4] reports 2 successful cases. In his opinion the serum should be as fresh as possible and injected at the earliest possible moment before much toxin has formed. He further states that in those cases in which the serum is doing good there is no danger of administering it in an excess, and even in cases where it does no good there is no evidence to show that the serum does harm. Anderson advises the administration of the serum for some time after apparent recovery, as its action depends mainly on increasing phagocytosis rather than the formation of an antidote.

Ayer[5] has reported a series of 15 cases of *erysipelas* treated by injections of antistreptococcus serum. He states that the immediate beneficial effects of the injection of 10 c.c. to 20 c.c. of serum are often striking, although not uniformly so. In favorable cases the patient's general condition is often improved at the end of a few hours. The temperature comes down suddenly; the pain and burning are diminished; restlessness disappears, and the patient often falls into a quiet sleep, from which he awakes free from any distressing symptoms. In addition, the amelioration of the constitutional symptoms there is also a decrease in the violence of the local conditions. Shortly after the first injection the swelling becomes less marked and desquamation begins so be apparent. Ayer states that the deleterious effects of the serum are so mild as to be of no consequence. His conclusions are as follows; 1. That the administration of antistreptococcus serum shortens considerably the course of an uncomplicated attack of erysipelas. 2. That it tends to inhibit extension of the disease. 3. That it has a strikingly beneficial effect upon the general condition of the patient, reducing the temperature, pain, and discomfort incidental to the disease. 4. That it rapidly reduces the pathological leukocytosis. 5. That it prevents or suppresses febrile albuminuria. 6. That its use is attended with no danger, even in large doses. 7. That the only disagreeable symptom referable to the serum observed by the writer is a transient eruption which occasionally occurs at the site of the injection. 8. That the efficacy of the serum treatment is in direct ratio to the length of time which has elapsed between the onset of the disease and the first injection of serum.

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[1] Berliner klin. Wochenschrift, October 31, 1904.

[2] Lancet, December 31, 1904.

[3] Ibid., February 25, 1905.

[4] Ibid., October 29, 1904.

[5] Medical Record, March 4, 1905.

Recently, Ayer[1] has reported 33 additional cases of erysipelas in which he has used the serum. He repeats his belief in the efficiency of the treatment. Ayer states that it is useless to administer the serum after the third day of the disease, but given on or before that time it will shorten the attack very markedly. In this last series the average duration of the disease was shortened 2.6 days.

Grizone[2] believes that the serum treatment of erysipelas is the rational one. Failure from its use he ascribes to using the serum too late or in insufficient doses. He claims to have obtained remarkable results in a case of marked severity complicated by otitis media and meningitic symptoms.

Meyer,[3] who is favorable to its use, states that he did not obtain any results in cases of erysipelas or scarlet fever.

Hamilton[4] is impressed with the action of antistreptococcus serum in conditions produced solely or in part large by the streptococcus. In his experience his results have been even more gratifying in scarlet fever than in puerperal sepsis. In an experience of about 50 cases of *scarlet fever*, he did not lose a case in which the serum was used from the beginning. He advocates the early administration of the serum in quantities sufficient to produce a noticeable change in twelve hours, and the repetition of it as often as indications demand. He administers 30 c.c. at the first dose and repeats it in twelve hours at the farthest. This dosage is kept up until benefit is obtained, when the dose is gradually diminished. Hamilton states that the use of the serum in no way interferes with any other treatment, such as stimulation and the treatment of any particular symptom. While it may be used in mixed infection as an aid to other methods, its success is not so marked.

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[1] Medical Record, August 26, 1905.

[2] Giornale medico del Regio Esercito; Medical Record, December 24, 1904.

[3] Loc. cit.

[4] American Journal of Obstetrics, November, 1905.

Shaw[1] describes the method of preparing the Moser serum and gives the results obtained in *scarlet fever* during the past four years at the Annakinderspital in Vienna. The serum is usually employed in only the severe cases with symptoms of general intoxication and in lethal cases. It is injected subcutaneously in the abdomen. The dose employed is 200 c.c. Within a few hours results from the serum are noticed. The fever falls to normal without any sign of collapse or sweating, the pulse rate diminishes, and its quality is improved. There is also a noticeable improvement in the nervous symptoms. Since the introduction of the serum sequelæ and complications have been less frequent, and when they do occur are less severe. Shaw states that mortality from scarlet fever in the Annakinderspital for the four years preceding the use of antistreptococcic serum averaged 14.5 per cent., and for the four years since its employment it has averaged 8 per cent. During this latter period the mortality from scarlet fever in other hospitals of Vienna has averaged 13.1 per cent. In common with other observers Shaw states that there is no danger in employing the serum, as the only unpleasant result is the production of an exanthem which may make the children uncomfortable.

Spencer[2] has successfully employed antistreptococcus serum in a case of *infectious endocarditis* and *pericarditis* occurring during convalescence from scarlet fever. He urges the early employment of the serum in doses regulated not by the age of the patient, but by the severity of the condition.

Walker[3] is also in accord with the prevailing opinions as regards antistreptococcus serum. He believes that strikingly beneficial results can be obtained from the use of the serum, especially if used sufficiently early and in large enough doses. He advises the use of a recently prepared serum of the "compound" variety.

Antityphoid Serum, either as a protective or curative agent, has for some reason received but little attention in this country. This is rather surprising in view of the favorable reports as to the efficiency of the serum.

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[1] Medical News, October 29, 1904.

[2] Lancet, February 18, 1905.

[3] Ibid., December 31, 1904.

Chantemesse,[1] who published his first paper in 1897, has recently given the results obtained with his serum under uniform conditions for three and a half years. This series numbered 765, of which 545 were treated by himself and the remaining 220 by Josias and Brunon. The mortality in this series was 4 per cent., while the average mortality of the other Paris hospitals during the same time averaged 18 per cent., the lowest being 12.8 per cent. Perforation occurred in 1.6 per cent., as against 2.6 per cent. in 8160 cases of other statistics. Chantemesse urges that the serum be injected early. No case of perforation occurred when the serum was injected prior to the seventh day. It is claimed that while the serum strengthens the defensive processes in the spleen, glands, and bone-marrow it requires the co-operation of the organism to cure.

The principles of administration are directly opposite to those employed with antidiphtheritic serum. With the latter the longer the duration of the disease and the more severe the symptoms the larger the dose; with antityphoid serum, however, the sicker the patient the smaller the doses should be. Chantemesse obtains his serum by injecting horses with soluble typhoid toxin.

Chantemesse's critics have claimed that his good results were obtained because of his personal care of his patients and to the use of the cold baths. As he states, however, others have obtained equally good results, and hospitals in which the cold bath is used extensively have had a uniformly higher mortality than his.

The results of the first work in this country on the production of an antityphoid serum have recently been published by Stokes and Fulton.[2] They obtained the serum from the hog and found both clinically and from laboratory experiments that this serum was not hæmolytic for human blood. The serum was used in 23 cases, 21 of which recovered. Of the 21 cases in which recovery took place, the authors believe that the serum contributed to the favorable result in 15; of the remaining 6 no effect, either for good or for evil, could be observed.

Smith,[3] who has made a careful study of the subject of antityphoid inoculation, believes that it has a distinct practical value to any community in which typhoid breaks out in an epidemic form or to those who have much to do with typhoid patients, and that it might be used with advantage among newcomers in certain endemic areas, such as some Indian stations and Malta. The inoculation, to obtain its fullest measure of protection, should be made at least two months before exposure to infection; this protection is extended for some years. Smith states that even when the inoculation is made shortly before exposure, the procedure is beneficial.

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[1] Presse médicale, 1904, No. 86.

[2] Journal of the American Medical Association, May 13, 1905.

[3] Journal of Tropical Medicine, September 1, 1904.

Bruce,[1] who was detailed to prepare a report on the results of Wright's antityphoid serum, gave an unfavorable reply. While he believes that the future of antityphoid inoculation is not particularly bright, the importance of the subject is so great in its possibilities when further developed that its study should be persevered in.

Ewing,[2] who has reviewed the entire subject of immunity in typhoid fever, is extremely skeptical about the various sera which have been employed. He states that it is becoming more apparent that the value of a bactericidal serum in well-established typhoid fever must be very doubtful, and that while such sera are curative in inoculated rabbits, it must be remembered that the animals do not have typhoid fever. He furthermore states that while such sera may be effective in the early stages of the disease, it is difficult to see how they can be otherwise than dangerous in the later stages of the disease, when the bactericidal power is commonly high and the organism is suffering from an excess of poisoning.

Wright's method of prevention, Ewing believes, has a much better theoretical basis.

Antitetanic Serum. As a prophylactic agent antitetanic serum now rests on a firm basis and its use as such is becoming more and more general. It is now the rule in the Surgical Dispensary of the Johns Hopkins Hospital to give all patients who have received punctured wounds or who have wounds of any description in which there is a possible danger of tetanus developing, an immunizing dose of antitetanic serum. There is little doubt but what this same procedure will be adopted in all surgical dispensaries and in private practice. Much credit is due the *Journal of the American Medical Association* for the publicitiy which it has given this subject. One year ago before the Fourth of July this journal published a special article giving in detail the methods to be adopted in case of Fourth of July injuries or those of a similar nature. The directions were given *in extenso* in last year's PROGRESSIVE MEDICINE, December, 1904, p. 302. The same journal, July 17, 1905, in an editorial, gives the following interesting and important facts: "Last year we received on a grand scale a demonstration of the efficiency of tetanus antitoxin as a prophylactic. Previously there had been several instances of the checking of hospital epidemics, or of stable epidemics among horses by this means, but there has probably never been so large an experiment performed as this. That it was successful the figures prove beyond a doubt. We have yet to hear of a single instance in which a patient with a blank cartridge wound who received a prophylactic injection of antitoxin later developed tetanus, although there were instances enough of such wounds not so treated that were followed by tetanus.

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[1] Journal of the Royal Army Medical Corps, February, 1905.

[2] Proceedings of the Pathological Society of Philadelphia, 1905, No. 3.

"As a prophylactic dose, from 5 to 10 c.c., injected subcutaneously, preferably in the vicinity of the wound, is sufficient; the amount depending on the age of the patient, although there seems to be no danger from large quantities. If this is done universally, we may confidently expect to see the great saving of life recorded last year repeated and increased this year, with the deaths from tetanus practically limited to those whose wounds did not receive medical attention until symptoms of the disease had already appeared."

Alexander[1] and Suter[2] have reported cases in which immunizing doses of antitetanic serum was successful. Suter urges the employment of the serum in individuals having wounds that threaten tetanus.

Anders and Morgan,[3] in a statistical study of tetanus, found that as a means of prophylaxis the serum has been fully tested, both in America and abroad, and there is uniform agreement that antitoxin does protect in every case.

They quote Scherck as follows: "In 1903 there were 56 cases of Fourth of July injuries treated, with 16 deaths from tetanus resulting; in 1904, 37 accident cases were treated, every one of which was given prophylactic injections of serum, with the result that no cases of tetanus developed."

Although it is the belief of Anders and Morgan that the antitoxin has no appreciable beneficial effect after the disease has become established, either in reducing the mortality or hastening recovery, a number of cures, due to antitoxin, have been recently reported by Booth[4] (3 cases), Montgomery[5] (1 case), Neordeir[6] (1 case), and Davidson[7] (1 case). Collins[8] reports a case of tetanus in which antitetanic serum and chloral and bromide produced no improvement. He then used, in addition to the above-mentioned remedies, *curare*. The curare should be given hypodermically, starting with $\frac{1}{6}$ gr., and increasing the dose according to the severity of the spasms. Collins does not believe that curare has any specific effect on the tetanus toxin, but that it has some influence in diminishing the severity of the clonic spasm by paralyzing the nerve endings.

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[1] Medical and Surgical Monitor, 1904.

[2] Archiv f. klin. Chirurgie, 1905, No. 1.

[3] Journal of the American Medical Association, July 29, 1905.

[4] Ibid., July 1, 1905.

[5] Medical Standard, November, 1904.

[6] Journal of the American Medical Association, September 17, 1904.

[7] American Medicine, August 5, 1905.

[8] Lancet, April 15, 1905.

Hopkins[1] reports 2 cases of tetanus successfully treated by intracerebral injections of antitetanic serum.

Rogers,[2] who has previously written on the subject of intraneural and intraspinal injections of antitoxin for the treatment of tetanus, has recently contributed another article on the subject. His advocacy of this means of treating tetanus is based on very convincing experimental work, an account of which he gives in detail. As a result of the experiments of Marie and Morax, and later Meyer and Ransom, it has been shown that wherever in the body the tetanus toxin is injected, some of it diffuses through the tissues to the neighboring end-apparatus of the motor nerves; the rest of the toxin passes into the lymphatics, thence into the general circulation, and from there to the capillaries, where it is brought into contact with all the other motor nerve end-apparatus. The toxin then enters the axis-cylinders of the motor nerves and is transmitted to the spinal ganglia. Even when the toxin is injected into the subarachnoid space, providing there is no injury to the nervous tissue, it is taken up by the lymphatics and is transferred in the manner above described to the spinal ganglia. The sensory nerves cannot take up the poison, and play no part in the process.

Rogers asserts that after tetanus has become manifest it is practically useless to give antitoxin subcutaneously, as it is slowly absorbed and rapidly excreted or destroyed; the toxin, on the other hand, is rapidly taken up by the motor nerves, where it is out of reach of the antitoxin. Under a general anæsthetic, preferably chloroform, the motor nerves which supply the region primarily affected should be exposed as high up as near the cord as possible and injected, by means of a fine hypodermic syringe, with 5, 10, or 20 minims of antitoxin. Inasmuch as some one of the extremities is the point usually involved, the nerve trunks in the axilla or the thighs (anterior crural or sciatic nerves) must be exposed and injected. Furthermore, as some of the poison also gains access to the ganglia through other motor nerves, this lesser charge must be blocked by direct injection of the spinal cord itself. In order to be effective, the injection into the cord should be as near the medulla as possible, particularly in those cases in which cyanosis is present and there is imminent danger of death through involvement of the vital centres of respiration and circulation. The effects of the toxin can still further be neutralized by injection of antitoxin directly into a vein. Under the proper precautions 10 to 20 c.c. may be given in this way. Rogers gives in detail an account of the symptoms and treatment pursued in 7 cases of tetanus. Of this number, 4 recovered; of the 3 deaths, 2 were due to an apparently overwhelming infection, and the third, he thinks, would have recovered had not diphtheria antitoxin been given by mistake at a critical period in the disease.

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[1] Medical News, October 10, 1904.

[2] Journal of the American Medical Association, July 1, 1905.

Schley[1] records one case of acute tetanus in which the intraneural and intraspinal injection of antitoxin were successful.

Antithyroidin. The treatment of conditions resulting from defective thyroid secretion, as myxœdema and cretinism, by the use of extract of the thyroid gland, is one of the greatest triumphs of modern therapeutics. So far, however, the treatment of exophthalmic goitre, which is the result of hypersecretion, has not been particularly successful, as the removal or partial removal of the gland is an operation of considerable magnitude and does not always lead to permanent improvement. Sera have been obtained and used, with not very satisfactory results. Lademann,[2] who has reviewed the various methods used in the treatment of *Graves' disease*, believes that the method proposed by Lanz in 1894 is the best. The latter fed individuals suffering from exophthalmic goitre with the milk of thyroidectomized goats. Lademann suggests the use of desiccated thyroidectomized milk in the form of tablets.

Antituberculous Serum. Marmorek's serum has received considerable notice during the past year and there is a disposition to view it much more favorably than when it first came out. The first reports, made by French physicians, condemned it, but following these reports Latham[3] and Richer[4] commented most favorably.

Recently, Richer[5] read a paper at the first meeting of the National Association for the Study and Prevention of Tuberculosis, in which he was most enthusiastic over Marmorek's serum. Some of the patients originally reported on in September, 1904, kept up their improved condition. Since that time he has been using the serum in the treatment of incipient pulmonary tuberculosis with uniformly good results. In some instances improvement was marked within forty-eight hours, with corresponding modifications in the physical signs, and in no instance was there an untoward symptom. Richer's technique is as follows: 10 c.c. are injected during the course of three days, 2 c.c. the first day, and 4 c.c. on each of the other days. A period of rest then follows, lasting at least ten days and sometimes fifteen days; he then proceeds as before until 50 c.c. have been injected. If, after an examination, the condition of the patient is good, Richer believes it is advisable to continue the inoculations every month, one of 50 c.c. being given for four or five months, in order to keep up the passive immunity conferred by the serum. He does not think it wise to use the serum in the last stages of tuberculosis because of possible injurious effects.

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[1] Medical Record, October 15, 1904.

[2] American Medicine, November 19, 1904.

[3] Lancet, April 9, 1904.

[4] Montreal Medical Journal, September, 1904.

[5] New York Medical Journal, June 10, 1905.

That Marmorek's serum has not received fair treatment is also the opinion of Frey.[1] He believes the serum has been overhastily condemned and that it is well worthy of an extended and impartial trial. In an experience covering over 350 injections, he observed urticaria in a few instances. Frey recommends that the injections be frequently interrupted by intervals of rest; itching, urticaria, or redness about the site of injection also call for a few days' cessation of the treatment. Temperature, purely tuberculous in character, was favorably influenced; toxic dyspnœa and diuresis were improved, and the expectoration, while at first increased, then diminished in amount.

Klein and Jacobsohn,[2] in their comments on Marmorek's serum, state that nothing is more natural than untoward effects from a serum. The accidents they noted were slight rise in temperature, urticaria, erythema, and arthralgias. Occasionally, weakness, loss of appetite, and general fatigue were complained of by patients. None of these symptoms mean anything, but their presence is an indication to diminish the dose or make the periods between doses longer.

The two most prominent serums for the treatment of tuberculosis now before the profession are Maragliano's and Marmorek's.[3] Maragliano's serum is produced from the cow. He injects the animals with an aqueous extract of virulent but dead bacilli, supplemented by the filtrate of a young culture. By this method he claims to obtain the full value of the bacillary bodies and toxins. Marmorek obtains a virulent culture of tubercle bacilli by growing them in a combination of leukotoxic serum (prepared by immunizing calves against guinea-pigs' leukocytes by peritoneal injections) and a bouillon extract of liver tissue. Filtrates of these cultures are then injected into horses.

Friedman[4] has produced a serum by injecting a cow with tubercle bacilli from the tuberculous lung of a turtle. He has found this serum effective in animals, and hopes to produce an antituberculous serum of great clinical value.

Apomorphine. Tull[5] reports remarkable results from the use of apomorphine in a case of *chorea*. A child, aged fifteen years, failed to improve under the usual remedies. A single hypodermic of $\frac{1}{40}$ grain of apomorphine caused a cessation of the movements and the child slept quietly. Tull then ordered $\frac{1}{20}$ grain of apomorphine by mouth every three hours and continued the use of arsenic. The child made an uneventful recovery, and at no time during the administration of the apomorphine was there any nausea or vomiting.

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[1] Münchener med. Wochenschrift, November, 1904.

[2] Bulletin général thérapeutique, July 30, 1904.

[3] PROGRESSIVE MEDICINE, September, 1904, p. 304.

[4] Deutsche med. Wochenschrift; Journal of the American Medical Association, January 14, 1905, p. 131.

[5] New York Medical Journal, March 11, 1905.

Arsenic. Alexander[1] has reported great improvement in a case of *arthritis deformans* from the use of arsenic for a long period of time. The drug was administered in the form of liquor potassii arsenitis for nearly two years. Because of suffusion of the conjunctiva, puffiness of the eyelids, nausea, and a tendency to diarrhœa the dose could not be increased beyond 16 drops three times a day. It is of interest to note that in this case no great degree of tolerance for the drug was obtained. Alexander also discusses the various untoward results which may arise from the prolonged use of arsenic, as neuritis, burning sensations of the skin on the hands and feet, pigmentation of the skin, atrophic condition of the skin on the dorsum of the hands, general thickening of the epithelium of the palms of the hands and soles of the feet, eczematous eruptions on the scrotum, and notching of the nails. All of the above changes occurred in the case reported by Alexander, but, as he points out, the same phenomena may be produced by arthritis deformans. As the result of experimental research, Macaggi[2] has demonstrated structural changes in the thyroid gland under the influence of arsenic and *phosphorus*. In acute intoxication with either of these drugs, there is a slight increase in the size of the gland, and the colloid passes into the lymphatics, besides being changed in its composition. In subacute and chronic intoxication the secretion of colloid is reduced and the epithelium becomes atrophied. Because of this latter fact Macaggi advises the use of arsenic and phosphorus in *hypertrophy of the thyroid gland.*

An obscure source of poisoning from arsenic has been pointed out by some investigations by the Department of Agriculture.[3] It was disclosed that samples of wall-paper, stockings, furs, and rugs contained from 20 to 1700 times as much arsenic as would be allowed by the law of Massachusetts, the only State having a law regulating the quantity of arsenic that may be used. Doubtless many cases of obscure arsenical poisoning might be traced to a small abrasion of the foot or neck being brought into contact with hosiery or fur containing arsenic.

Atropine. The atropine treatment of *inebriety* recommended by McBride is favorably reported on by Simpson.[4] The principles of this treatment, which were given in the September number of PROGRESSIVE MEDICINE, 1904, consist in: 1. The administration of atropine in $\frac{1}{200}$ gr. (gradually increased to $\frac{1}{50}$ gr.) doses three times a day until the pupils are affected and the mouth becomes dry. 2. Strychnine nitrate, beginning with $\frac{1}{60}$ gr., three times a day and increasing up to $\frac{1}{20}$ gr. 3. Fluidextract of red cinchona bark every three hours in ordinary doses by mouth. 4. Through regulation of the bowels and an easily assimilated diet.

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[1] Journal of the American Medical Association, February 25, 1905.

[2] Riforma Medica, 1904, No. 32.

[3] Journal of the American Medical Association, October 22, 1904.

[4] British Medical Journal, January 21, 1905.

Sanders[1] has reported an unusual instance of *belladonna poisoning*, inasmuch as the untoward symptoms were produced by the application of a belladonna plaster. The usual symptoms of belladonna poisoning resulted. Morphine was used in this case, and in addition, pilocarpine nitrate.

Bathing. Marvel,[2] who has had a large experience with the after-effects of ocean bathing, has contributed an article on that subject. If after an ocean bath there is a general glow and a feeling of internal warmth, accompanied by a sense of invigoration, the effect is beneficial. On the other hand, if the bath is followed by chilliness, depression, and languor the bath is harmful. The practice of sitting about in wet bathing clothes after long exposure in the surf he strongly condemns. It is a difficult matter to tell patients just how long they should remain in the surf, inasmuch as the time it takes to produce chilliness and depression will necessarily vary in each individual. People should be instructed to leave the water while they are feeling perfectly warm and invigorated; this may be five minutes or as long as ten or fifteen minutes.

Marvel recommends sea bathing in cases with lessened metabolic activity or in those with a condition of perverted nutrition, as in some functional disturbances of long standing. It is contraindicated in cases with arteries which are weakened or have lost their elasticity, organic heart disease, recent rheumatism, cholelithiasis, acute gastrointestinal or febrile disease, or in any condition in which the normal resistance is greatly reduced. Pregnant women should not bathe when the sea is rough, as there is danger of miscarriage.

Marvel is undoubtedly right when he says that ocean bathing, as carried out at the Atlantic coast resorts, is productive of more harm than good. Individuals suffering from any acute or chronic disease should never bathe in the ocean unless they have first consulted a physician as to its advisability. Quite recently I have had an experience illustrating this point. A man with pulmonary tuberculosis which had undergone arrest spent two days at the seashore. During his visit he took an ocean bath, staying in the water for an hour and a half, which resulted in an obstinate attack of gastroenteritis and a relapse of the pulmonary condition.

Heubner[3] recommends mustard-water packs in the treatment of *capil-*

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[1] Journal of the American Medical Association, October 15, 1904.

[2] Ibid., April 8, 1905.

[3] Therapie der Gegenwart, 1905, No. 1.

lary bronchitis. While the treatment fails in some cases, he considers it a most valuable procedure in those cases of capillary bronchitis where the respiration is embarrassed by the swelling of the mucous membrane and accumulation of inflammatory products in the finer bronchial tubes.

The mustard-pack is made and applied as follows: A pound of mustard flour is stirred in an open dish containing 3 pints of water heated to 104° until the irritating vapors of the mustard are given off. A linen cloth large enough to envelop the child is then wrung out in the mustard-water and spread over a blanket slightly larger. The child is then placed on the sheet and wrapped up from the neck down. The child is allowed to remain in the pack from ten to twenty minutes, the time depending on its vitality. When removed from the pack the whole body is red. Immediately on being removed from the pack the child is placed in a warm bath or sponged off with warm water, in order to remove any particles of mustard adhering to the skin. Following this the child is then placed in a lukewarm pack from one to ten hours, if possible, in order to maintain the hyperæmic condition of the skin. While in the second pack the child should be under constant supervision, as the temperature is liable to rise, accompanied with redness of the head and face; in the latter event or after free sweating the child should be removed from the pack. After removal from the second pack a second warm bath is given, and if the child is very hot cold water is quickly poured over it. The child is then wiped dry and left undisturbed for twenty-four hours. This procedure often results in a crisis with a rapid convalescence, but more frequently it must be repeated on the second or third day; it should not be employed oftener than once in twenty-four hours. In case the mustard-pack fails to produce reddening of the skin it is best not to repeat it.

For the purpose of producing sleep and allaying the nervous symptoms in *delirium tremens*, Broadbent[1] recommends ice-cold water sponging. The bath is given as follows: The patient is stripped and placed on a blanket over a waterproof sheet. By means of a large sponge the ice-cold water is then dashed violently over the face, neck, and anterior surface of the body. These surfaces are then dried by brisk friction with a rough towel, and the same procedure repeated a second and a third time. The posterior aspect of the body is then treated in the same manner. By the time the alternate sponging and drying are completed the patient is usually fast asleep.

Edgar[2] calls attention to some important facts regarding bathing during the *menstrual period.* He states that: 1. All forms of bathing during the menstrual period are largely a matter of habit and usually can be acquired by caution and gentle progression, but not for every woman does this hold good, and surf bathing, where the body surface remains chilled for some time, should always be excepted. 2. A daily tepid sponge bath (85° to 92°) during the menstrual period is not only a harmless proceeding, but is demanded by rules of hygiene. 3. In the majority of, if not all, women, tepid (85° to 92°) sponge bathing after the establishing of the menstrual flow, namely, second or third day, is a perfectly safe practice. 4. Furthermore, in most women the habit of using the tepid shower or tub bath after the first day or two of the flow can with safety be acquired.

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[1] British Medical Journal, July 1, 1905.

[2] Journal of the American Medical Association, October 22, 1904, p. 1256.

Anders,[1] after some personal observations at Bad Nauheim, has given his experience with the *Schott method of treating diseases of the heart and bloodvessels.* While this treatment has been firmly established as an excellent therapeutic measure for some years, it has met with little favor in this country, and, indeed, its action and mode of application is but poorly understood. The efficiency of the Bad Nauheim baths is not entirely due to the healing qualities of the waters, as the "resistance exercises" are almost of equal therapeutic value. In addition, careful attention is paid to the dietary, hours of sleep, recumbency, and after-treatment.

The bath waters at Bad Nauheim contain sodium chloride, calcium chloride, various forms of iron, and probably most important a large amount of carbonic dioxide. The baths are given at various strengths and different temperatures. The "resistance exercises" employed in the Schott method consists in the gentle exercise of different groups of muscles, especially those of the extremities, and exert their influence over the cardiovascular system rather than the muscular system. The exercises stimulate the peripheral motor nerves, while the baths act on the sensory nerve filaments. In this way a tonic effect is exerted on the myocardium. In addition, according to Broadbent, the movements drive the blood to the right side of the heart by compression of the veins.

Anders quotes the rules laid down by Thorne for the performance of these movements: 1. Each movement is to be performed slowly and evenly; that is, at a uniform rate. 2. No movement is to be repeated twice in succession in the same limb or groups of muscles. 3. Each single or combined movement is to be followed by an interval of rest. 4. The movements are not to be allowed to accelerate the patient's breathing and the operator must watch the face for the slightest indications of (*a*) dilatation of the alæ nasi, (*b*) drawing of the corners of the mouth, (*c*) duskiness or pallor of the cheeks and lips, (*d*) yawning, (*e*) sweating, and (*f*) palpitation. 5. The appearance of either of the above signs of distress should be the signal for immediately interrupting the movement in process of execution, and for either supporting the limb which is being moved or allowing it to subside into a stage of rest. 6. The patient should be directed to breathe regularly and uninterruptedly, and should he find any difficulty in doing so, he must be instructed to continue counting in a whisper during the progress of each movement. 7. No limb or portion of the body of the patient is to be constricted as to compress the vessels and check the flow of blood.

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[1] Philadelphia County Medical Society, November 9, 1904.

The use of resistance movements in heart disease has been discussed by Davis, whose article was called attention to in PROGRESSIVE MEDICINE for December, 1904, p. 325.

Anders states that while the Schott method is powerless to cure a chronic valvulitis, it is the most satisfactory means of bringing about compensation in either simple dilatation or in that form of dilatation associated with chronic valvulitis.

Cases with a moderate degree of arteriosclerosis and embarrassment of the heart action are greatly benefited by the treatment, as the lumen of the arteries, both large and small, is widened and the heart is thus relieved and given a chance to rehabilitate itself. Angina pectoris is another condition which is greatly benefited.

Anders also calls attention to a large class of cases with a moderate degree of dilatation brought about by severe mental taxation and characterized clinically by neurasthenic symptoms, evidences of malassimilation, and indigestion.

In order to prevent the sending of patients unsuitable for the treatment, the following contraindications should be borne in mind: 1. Cases presenting fever. 2. Advanced arteriosclerosis. 3. Far-advanced myocarditis. 4. The closing stages of chronic valvulitis with extreme dilatation. 5. Aneurysms of the large arteries, except in the incipient stage. 6. Any case in which the blood pressure is lowered by the balneologic treatment. 7. Cases in which a tenometric figure as low as 65 or 60 mm. of mercury is found. 8. Cases with well-marked chronic bronchitis or asthma.

In the discussion of Anders' paper, Tyson[1] stated that he had employed the treatment in the patient's home, but had experienced considerable difficulty in doing so. This was because of the lack of suitable assistants to oversee the resistance movements and to the inability to successfully secure the carbonic acid under sufficient pressure. Anders, in his paper, stated that he believed that much of the good effects of the bath were lost if the patient could not be freed from business and domestic cares and worriments. This was also concurred in by others.

Cohen[2] has used the Schott treatment in the patient's home for some years past and believes that excellent results can be obtained. As carried out in the patient's home, Cohen recommends giving the baths in a course of six, eight, or ten weeks, interrupting them for eight, ten, or twelve weeks, and then repeating them for two or three weeks. These intervals of repeating and interruption may be again carried out according to the needs of the individual case. The bath is given at night, in order to secure several hours of continuous rest afterward. The bath is given every other day or every third day and is followed by massage, if necessary. On the alternate days exercise is given if this seems desirable.

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[1] Philadelphia County Medical Society, November 9, 1904.

[2] Ibid.

Two or three baths with ordinary water at varying temperatures are first given, in order to note the results. A weak brine is then substituted, so that by the fourth bath 4 pounds of sodium chloride and 4 ounces of calcium chloride are contained in 40 gallons of water. At every second bath the sodium chloride is increased 2 pounds and the calcium chloride 2 ounces. At the twelfth or fourteenth bath the brine is not strengthened any more.

For the obtaining of a suitable carbonic dioxide effect, Cohen recommends the following method. The ordinary bath-tub is half-filled with hot water (about 20 gallons) and a sufficient quantity of sodium chloride, calcium chloride, and sodium carbonate is added. At the end of twenty minutes thorough dissemination has taken place, and 20 gallons more of hot water added. The temperature should be about 95°. Acid sodium sulphite (32 ounces), in the form of cakes (eight of 4 ounces each), is then distributed at proper distances, and in a few minutes there is thorough effervescence.

At the sixth ordinary brine bath the carbon dioxide may be added by taking half the quantity of sodium carbonate (16 ounces) and half of the acid sodium sulphate cakes. At the eighth or tenth bath the full amount of carbon dioxide may be used, and if gradually approached, the carbon dioxide may be doubled in amount.

The length of the first bath, according to Tyson, should be five minutes, at a temperature of 95°. The second bath may be increased to six or seven minutes, then gradually lengthened to ten or fifteen minutes. The temperature should be correspondingly reduced. At Bad Nauheim the lowest temperature at which the baths are given is 80° to 82°. Packages containing salts necessary for the baths may be obtained from the Triton Salt Company and Mr. H. A. Cassebeer, of New York.

G. W. Norris[1] has successfully applied the artificial baths in patients suffering from dilated heart. The cases in which he used the baths were tuberculous patients in the Phipps Institute. In each case there was a drop in the pulse rate and an appreciable decrease in the area of cardiac dulness.

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[1] Personal communication.

Boric Acid. For years this substance has been looked upon as practically harmless, and little thought is ever given to the possibility of its producing toxic symptoms sufficiently severe to cause death. The greatest source of danger seems to be from packing wounds with the dry powder, although irrigations with solutions of various strengths have also produced fatal results. Best,[1] in reporting a fatal case, states that he found in the literature reports of five cases of severe intoxication and four deaths. Since the appearance of Best's paper Dopfer[2] has recorded an additional fatal case. In the instance related by Dopfer boric acid ointment was applied to the arm of a child, aged ten years, who had been severely scalded.

Chevalier[3] states that the ill effects of the drug usually appear at the end of the third or fourth day, when the system has become saturated either through non-elimination or faulty elimination. The symptoms of boric acid poisoning are variable. Skin eruptions of various forms are common, as are also disturbances of the digestive tract, particularly vomiting. Symptoms of collapse are also common and there may be depression of the nervous system. Chevalier states that the effects of boric acid should be carefully watched in patients suffering from kidney disease, a fact which receives additional confirmation from the experimental work of Harrington.[4] Bock[5] recommends boric acid in the treatment of simple *parenchymatous goitre.* He administered the drug in 10-grain doses three or four times daily. He states that no ill effects were noted from these doses, probably because elimination was stimulated by the free use of water, two glasses being taken with each 10-grain dose. In connection with what has already been said about the toxic properties of boric acid, one of Bock's cases is of interest. In this instance the patient took the acid with only a swallow of water. A dermatitis was produced on the third day but quickly disappeared on the withdrawal of the drug.

Bromides. Morton and Hodskins[6] state that they obtained the best results in the treatment of *epilepsy* with hypodermic injections of sodium bromide. They used a solution of 30 grains to the ounce. The injections were made just below the scapula, and the amount necessary varied from 60 to 180 grains. The injections were most successful in aborting a threatened seizure. The substitution of sodium bromide for sodium chloride reduced the quantity of bromide necessary by one-half. This method does not entirely satisfy the craving for salt, however, and can only be employed in the more intelligent patients.

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[1] Journal of American Medical Association, September 17, 1904.

[2] Münchener med. Wochenschrift, April 18, 1905.

[3] Revue francaise de méd. et de chir., January 9, 1905.

[4] American Journal of the Medical Sciences, September, 1904.

[5] American Medicine, March 25, 1905.

[6] Abstract American Medicine, June 24, 1905.

Peterson[1] is much opposed to the use of bromides in epilepsy, particularly in the manner usually employed. He states that as a rule the effects of the drug are worse than the disease. If the drug is to be used employ small doses, and, better still, instead of the ordinary bromide salts prescribed, some form of brominized oil which is less powerful and less noxious. Peterson states that the best results are obtained in epilepsy by the general hygienic and dietetic measures, preferably at one of the epileptic colonies.

Eichberg[2] has found *strontium bromide* of value as a diuretic, especially in cases of *nephritis*. He administers the drug in 10-grain doses three times daily, and after a good diuretic effect has been produced, the dose is cut down to 5 grains three times daily.

Bromide eruptions have been considered by Dr. Gottheil in the September issue of PROGRESSIVE MEDICINE. Additional views on the subject are given by Chirivino.[3] He attributes this untoward effect to gastric disturbances. The bromides should not be administered in cases of hyperacidity; acids are to be avoided, and in cases of eruption the bromides should be suspended at once and the stomach treated.

W. P. Spratling[4] is also opposed to the indiscriminate use of the bromides in epilepsy. He states that after half a century the bromides have not raised the percentage of cures in epilepsy a single point. Furthermore, they are not only powerless to cure but do much harm as ordinarily administered.

Spratling states that not more than 50 to 60 per cent. of patients with epilepsy should be given bromide in any form. When used it is not necessary to give more than 12 to 15 grains, or, at most, 20 grains, three times daily; emergency doses may exceed this. Among the factors that have led to the abandonment of bromide in treating epilepsy Spratling mentions the following: (1) The recognition during the past few years of the necessity of treating the individual *in toto*, in contradistinction to the treatment of a single symptom. (2) The use of depressants that possess the virtues of the bromides but not their faults, the chief agent of this kind being pure bromine in oil of sesamum, given in the form of an emulsion. (3) The use of Toulouse's method of a diet poor in salt to augment their value of relatively small doses of bromide. He states that with a diet low in salt that 10 grains of bromide will have the effect of twice that amount as ordinarily employed.

[1] American Medicine, June 24, 1905.

[2] Cincinnati Lancet-Clinic, October 8, 1904.

[3] Giornale Internazionale delle Scienza Mediche, October 31, 1904; abstract Medical Record.

[4] New York and Philadelphia Medical Journal, August 19, 1905.

For the first few years after the opening of the Craig Colony it was a common occurrence to admit patients showing marked evidences of bromism, in some there was pronounced bromic dementia. This was due to the enormous doses of bromide employed (40 to 60 grains t. i. d.). Spratling states that these conditions are becoming less noticeable, although the number of admissions is greater.

Cactus Grandiflorus. Ellingwood[1] believes that this drug is far superior to either strophanthus or digitalis, in that it produces no irritation of the heart muscle like strophanthus or gastric irritation like digitalis, and is, furthermore, free from any cumulative action. He recommends cactus grandiflorus when there is an irregular pulse, due to feebleness of the heart's action, with dyspnœa, weight or oppression in the chest, or when there is violence with irregularity of the heart's action, and especially when there is a sensation of constriction, as of a band around the heart or around the chest.

Ellingwood says the drug should be persisted in when the heart muscle is enfeebled or when there is mitral or aortic insufficiency with atonicity.

In functional irregularity of the heart, especially if due to gastric irritation, it is doubly of value in that it corrects the cardiac condition and soothes the gastric irritability.

Functional disturbances resulting from tobacco, particularly cigarettes, are extremely amenable to cactus grandiflorus.

The sedative action of the drug makes it of value when there is an irritable, irregular, and feeble pulse in the presence of fever, or when there is cardiac weakness associated with a weak and exhausted nervous system. Atonicity, Ellingwood states, is the keynote in its administration, and for this reason renders it particularly serviceable in the cardiac weakness following typhoid fever or other severe and exhausting diseases. Cactus grandiflorus is contraindicated when there is violent heart action or persistent palpitation from increased tonicity or in the presence of a temporary exaltation of nervous or muscular tone.

It is administered in the form of the tincture, in 2 to 8 minim doses or the fluidextract, in 2 to 4 minim doses. Ellingwood recommends that the drug be given in small doses, frequently repeated, especially when a sedative action is desired.

Camphorated Naphthol has been used in the form of injections for *cold abscesses.* Broca,[2] however, does not believe camphorated naphthol of much value. He was further influenced in abandoning it because a number of deaths have been reported from its use, and besides, it has been shown experimentally that it is very toxic for both rabbits and guinea-pigs.

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[1] Medical Record, June 3, 1905.

[2] Revue francaise de med. et de chir., February 13, 1905.

Guinard[1] has reported a death from an injection of camphorated naphthol, and has found 12 additional cases in the literature. There are, in addition, a number of instances in which convulsions and other symptoms of intoxication occurred, but the patients recovered.

Carbolic Acid. Adams[2] reports a case of *carbolic acid poisoning* simulating acute scarlatinal nephritis. A child, aged ten years, with a moderately severe attack of scarlet fever, developed intense itching of the skin. To allay this symptom the mother was instructed to bathe the child twice daily with a solution of carbolic acid (a teaspoonful to a quart of water). The itching was relieved, but thirteen days later the child passed some dark urine, which was found to contain carbolic acid. The eyelids were slightly puffed. The kidney irritation promptly subsided after the elimination of the carbolic acid.

Two cases of carbolic acid poisoning have been successfully treated by the internal administration of *vinegar*. One of the cases is reported by Zelensky[3] and the other by Szwajkart.[4] Burke[5] places no confidence in the sulphates as antidotes for this condition. He believes that *alcohol*, however, is of great value. It should be given in the form of whiskey by mouth, and if this cannot be done the alcohol should be administered hypodermically and by the rectum.

Castor Oil and Salts. The following formulæ are recommended by Carlton[6] for the administration of castor oil and magnesium sulphate:

1. Olei ricini dulcis.

℞—Vanillin		gr. xx.
Olei menth. piper.		f ʒ j.
Saccharin.		ʒ iss.
Alcohol		f ℥ iij.
Tr. persionis		f ℥ ss.
Olei ricini	q. s. ad	½ gallon.

Directions for Mixing. Dissolve the vanillin, oil of peppermint and saccharine in the alcohol. Add the tincture of cudbear to the oil and shake thoroughly. Finally unite the two mixtures. This mixture keeps well, has no bad after-taste, and is readily taken by children or adults who have acquired a repugnance for the oil.

2. Liquor magnesium sulphatis compositus.

℞—Magnesii sulphatis		℥ xxxij.
Tr. cardamomi comp.		f ʒ ij.
Vanillin		gr. xx.
Saccharin.		℥ ij–iv.
Alcohol		f ℥ ij.
Glycerin.		f ℥ ij.
Coffee (roasted and ground)		℥ ij.
Aquæ	q. s. ad	½ gallon.

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[1] La semaine médicale, Dec. 28, 1904.

[2] Archives of Pediatrics, Dec., 1904.

[3] La semaine médicale, Sept. 7, 1904.

[4] American Medicine, Dec. 31, 1904.

[5] New York Medical Journal, Oct. 8, 1904.

[6] Medical News, Oct. 8, 1904.

DIRECTIONS FOR MIXING. Stir the coffee in ½ gallon of boiling hot water and allow it to stand for ten to twenty minutes. While this is still hot add enough of it to the magnesium sulphate to make about 3½ pints. Dissolve the vanillin in the alcohol, add the glycerin to it, and then the cardamom. When the first solution has cooled somewhat, add the second mixture to it. After shaking thoroughly, add the saccharine and enough of the coffee infusion to make ½ gallon. Finally, pass through a covered filter.

An ounce of this mixture contains ½ ounce of the magnesium sulphate.

Carlton states that this mixture may be given hot or cold, and that it is his custom to dilute it with twice its volume of water at the time of administration.

Chlorate of Potassium. A well-marked case of poisoning from chlorate of potassium is reported by Day.[1] The case also illustrates the pernicious habit of applying to druggists for medical advice. In this instance a man complaining of a slight sore throat was given a bottle of potassium chlorate tablets. The bottle contained fifty tablets of 5 grains each, and was consumed between March 19th and April 1st. On April 2d he complained of itching, and this continued for four days, when he consulted a doctor. At this time, in addition to the itching, he had a temperature of 101°, and scattered over the extremities and trunk there appeared slightly raised reddish macules and innumerable petechiæ, evidently due to minute hemorrhages. These rapidly coalesced and became of a more brilliant color. The urine showed a trace of albumin and a few hyaline and granular casts. Although this drug is capable of a most destructive action on the blood, no such effect was noted in Day's case, the examination showing 5,016,000 reds. The hæmoglobin could not be estimated, as the blood was of a deeper red than the test-glass used. Recovery in this case was slow and uneventful.

Chloretone. According to Bowcock,[2] chloretone is an ideal hypnotic, as it does not depress either the heart or respiratory centres and is free from the danger of becoming a "habit." It is also sedative in its action, rendering it of value in the treatment of *asthma, epilepsy,* and particularly the *vomiting of pregnancy.* The drug is soluble in alcohol, ether, oils, and glycerin, and is unaffected by light or heat. The dose is from 10 to 20 grains. It may also be administered in the form of sugar-coated tablets, 3 grains each.

Chloride of Calcium. In a study of *hæmophilia,* Kinnicutt[3] found the following treatment the most satisfactory for this condition: The internal administration of calcium chloride in doses of 30 grains two or three times daily. Its use should be discontinued every two or three days for a period of twenty-four hours. For accessible external bleeding points an aqueous solution (½ per cent.) of calcium chloride may be applied with compression or the calcium may be applied in the form of a finely powdered chalk mixed with ½ per cent. solution of calcium chloride. Calcium phosphate is also equally efficient for local application. A ½ per cent. solution of calcium chloride and ⅛ volume of a solution of nucleoalbumin may also be used locally. Other local measures are the application of a stream of *carbonic acid gas* to the bleeding point when accessible or its inhalation, freely mixed with air for concealed hemorrhage; the use of 4 per cent. solution of cocainæ hydrochlorate for surface bleeding and of adrenalin (1:1000) with compression.

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[1] Journal of the American Medical Association, July 22, 1905.

[2] Medicine, October, 1904.

[3] Medical Record, June 10, 1905.

Sahli,[1] however, states that the internal use of calcium chloride is still on trial, and that if used locally it should be forced into the lumen of the vessel by compressing the bandage. Sahli, from a number of tests on 4 hæmophilics, states that the best results are obtained by the use of a thick and firmly applied 2 per cent. gelatin gauze dressing.

Chloride of Ethyl. Morrow[2] found the chloride of ethyl very efficient as a counterirritant in the treatment of *herpes zoster*. He states that in cases in which the pain has been so severe as to cause sleeplessness, this treatment will give great relief. An area the size of a silver dollar is frozen at the point where the nerve emerges from the spinal column, or, better still, areas may be frozen where the pain is localized. Relief may be obtained from one freezing for a day or more. Where the relief lasts but for a few hours there is no objection to applying the ethyl chloride frequently.

Chloride of Sodium. In an editorial on the subject of saline infusions Hare[3] urges that physicians and surgeons use more care in the preparation of the physiological salt solution. Haphazard methods are to be discouraged, and the old rule that the solution may be made by adding a teaspoonful of common salt to a pint of water should be avoided. There is no reason now why accurate solutions are not available for everyone, as a concentrated saline solution made after the formula of Ringer, as modified by Locke, can readily be obtained either from any druggist or direct from Parke, Davis & Co., the manufacturers. Hare points out the necessity of accuracy in the preparation of a salt solution, from the fact that too little salt causes the corpuscles to swell and lose their hæmoglobin or even entirely destroy them; if the solution is too concentrated the corpuscles shrink. The proper strength of the saline solution is 0.9 per cent., and it has been also demonstrated that a small amount of calcium and potassium is necessary. In this connection a fatal case of

[1] Zeitschrift f. klin. Medicinische, 1905, Nos. 3 and 4.

[2] Journal of Cutaneous Diseases, April, 1905.

[3] Therapeutic Gazette, November 15, 1904.

sodium chloride poisoning reported by Combs[1] is of interest. During a vaginal operation 500 c.c. of saline infusion were ordered to be injected beneath each breast of the patient. By mistake the concentrated stock solution was given instead of being diluted 0.9 per cent. Four hours later the patient was unconscious, and at this time it was discovered that the concentrated solution had been used. Estimation of the sodium chloride showed that 1920 grains had been absorbed and diffused throughout the body. The patient remained in coma for six hours, when she became maniacal. The pulse was 190, respiration 70, and the temperature slowly rose to 104.6°. The nausea was constant and the thirst insatiable. A quantitative examination of the vomitus showed 5 grains of sodium chloride per drachm. The red blood corpuscles were shrivelled and crenated from exosmosis. Death occurred in twenty-four hours.

Souther,[2] who has contributed an article on the indications for hypodermoclysis, names the following conditions: Excessive hemorrhage from any cause; the infections and toxæmias; suppression of urine not associated with dropsy; shock; inability to otherwise introduce sufficient fluid into the body; concentration of blood; as an anteoperative measure in anæmic conditions in patients who have lost much blood or in bloody operations on aged subjects; postoperative thirst and threatened collapse in cholera infantum, cholera morbus, or Asiatic cholera.

Hypodermoclysis is contraindicated in apoplexy, arteriosclerosis, pulmonary œdema, dilated right heart, threatening sudden death and sudden collapse from chloroform or ether narcosis. In the latter condition it is too slow to be of service. It may also be added that in the light of recent investigations sodium chloride infusions should not be employed in uræmic conditions.

Investigations continue on the *dechloridation treatment* or salt-free diet in *nephritis.* At the twentieth annual meeting of the Association of American Physicians two papers were presented on this subject. Kelly and Fife reported on three cases of chronic nephritis in which salt had been rigidly excluded from the diet. They concluded that such a diet was of value and had some prognostic significance in estimating the severity of the lesion. The use of saline solutions in nephritis was condemned as being harmful. J. L. Miller also presented a paper on this subject. He found that there was a poor elimination of sodium chloride in nephritis, and following the use of large amounts there was an increase in the œdema, albumin, and uræmic symptoms. In the discussion following these papers several of the speakers referred to the injurious effects of saline solutions in nephritis.

[1] American Medicine, April 22, 1905.

[2] Cincinnati Lancet-Clinic, September 17, 1904.

Ambaro and Beaujard[1] state that for the retention of chlorides, with the resulting headache, dyspnœa, and high arterial tension, a salt-free diet, theobromine, free purgations, and rest in bed is the best treatment. These writers believe that a salt-free diet must be kept up indefinitely in order to guard against danger. Additional information on this subject is contained in Dr. Bradford's article in the present volume.

Muskens[2] reports that a salt-free diet in *epilepsy* resulted in a more favorable action of the bromides. Women bore the treatment better than men and the attacks of petit mal were more influenced than those of grand mal. A salt-poor diet has been in use at the Massachusetts Hospital for Insane for several years. Morton[3] states that the treatment consists in the substitution of sodium bromide for sodium chloride. It is claimed that by using the bromide in this way only about half the quantity is necessary. This form of treatment can be successfully carried out in intelligent patients, but is practically useless in middle grade epileptics who have neither the will nor the desire to carry it out properly. In the idiotic and demented patients a salt-poor diet, in which equal parts of sodium chloride and sodium bromide may be used.

Collins[4] states that two years ago 25 hospital epileptics were given a reduced salt diet, which resulted in a reduction of 38 per cent. in the frequency and severity of the epileptic seizures. The same treatment was recently applied in 5 dispensary patients, with the result that the frequency of the attacks in 4 of them was reduced 50 per cent.

Griess[5] states that the objectionable features of *silver nitrate* in the treatment of *chronic anterior* and *posterior urethritis* may be overcome by the use of sodium chloride. By its use the caustic effect of the silver is to a great extent eliminated and stronger solutions of the silver may be employed. The sodium chloride solution is injected with a Keyes-Ultzmann deep urethral syringe in the same manner as the silver solution. Enough time should elapse after the injection of the silver to allow the operator to wash out the instrument, fill it with salt solution, and proceed as before.

Climate. The influence of climate in the treatment of pulmonary tuberculosis has led to many acrimonious discussions in the past, and it seemed at one time as though the divergent views on the subject would never be reconciled. Within the past few years, however, the view that climate is the all-important factor has been greatly modified.

Thus, the report of the Committee on the Influence of Climate in

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[1] La semaine médicale, 1905, tome xxv., No. 12.

[2] Neurologisches Centralblatt, March 1, 1905.

[3] Boston Medical and Surgical Journal, June 15, 1905.

[4] American Medicine, June 17, 1905, p. 974.

[5] Therapeutic Gazette, September 14, 1904.

Pulmonary Tuberculosis, read before the National Association for the Study and Prevention of Tuberculosis, is of particular interest in that it was made by Minor, Solly, Baldwin, McGahan, Sewall, and Bridge,[1] all of them men having strong climatic affiliations. In this report the committee states that no advanced worker in this line would to-day, as was formerly done, place climate first in the order of therapeutic measures. It must never be forgotten that hygiene, diet, teaching, and supervision always come first. They state, however, that these measures yield infinitely better results if reinforced by a suitable climate. This latter fact, I think, is pretty generally conceded, provided, of course, that the patient is able to avail himself of this additional advantage.

The Committee endorsed the following quotation previously published by one of its members: "If, however, one has to choose between treating patients in narrow circumstances in their own homes or sending them to a resort where their poverty will not enable them to get the necessary conditions of quarters, diet, and care, which are so essential, by all means let them stay at home. By changing their houses, by moving to the top floor, using the roof as an out-door sun parlor and spending the utmost possible part of their time there, by economizing in every other way in order to be able to spend more freely for good food and cookery, much can be done, provided always that their lives can be properly supervised. When pecuniary reasons prevent the patient from seeking a special climate excellent results can thus be had, though with greater difficulty in the patient's home, if the case is not too far advanced and that home too miserable."

As a warning to those who send patients to the various climate resorts without first thoroughly investigating both their physical and financial status the experience of Mr. F. D. Witherbee[2] may be cited. In an investigation of the health resorts in the great Southwest he learned that from two-thirds to four-fifths of those sent there were hopelessly incurable and beyond the help of any power on earth. He found the streets filled with these poor consumptives—thin, wretched, homesick, and suffering, and, worst of all, in many cases utterly destitute. The hospitals, sanatoria, and almshouses were filled with indigent, dying consumptives; public and private charities were taxed to their utmost, and only too frequently the wretched sufferers died alone and unattended in some lodging-house. What he characterizes as the "inexcusable stupidity which sends these people hither to die friendless and alone," cannot, however, be entirely laid at the door of the medical profession, as a not inconsiderable proportion of them seek these resorts on their own responsibility.

[1] Journal of the American Medical Association, June 10, 1905.

[2] Charities, November 6, 1904.

In commenting on Mr. Witherbee's paper the *Journal of the American Medical Association*, November 19, 1904, concludes with the following: "Our knowledge of the proper treatment of tuberculosis has increased so enormously of late years that there is no longer any excuse for this blind, indiscriminating method of shipping out West consumptives of all classes in all stages of the disease. Rather let us reserve that treatment for the favored few who have ample means, and for the others let us direct our energies, in the first place, to the providing of sanatoria in our own states; sanatoria for those of small means and for those of no means at all. In the second place, and this is even more important, let us endeavor to devise methods of home treatment for tuberculosis, for this is the only way in which the modern treatment for that disease can be applied to the great majority of its victims."

The number of articles bearing on the subject of what is best for the tuberculous patient has been extremely large during the past two or three years. In fact, the subject has been so thoroughly rehashed that there is little excuse for not knowing what to do in any given case. Dunn[1] has recently written an article in which he points out the class of cases in which climate may be entirely ignored: 1. When the financial status of the patient is such that he cannot live in a health resort under conditions just as good as those obtainable at home, with or without the same expenditure of money. 2. When the patient has not the moral backbone to make a business of getting well. 3. When the disease has become hopelessly advanced.

In order to eliminate the first class a knowledge of both the patient's financial status and the rates of living at the various resorts is necessary. This is too frequently neglected and patients are carelessly ordered to this or that resort without knowing whether they can even afford it. With those who lack perseverance experience, as a rule, is the only guide.

There should be no difficulty with the hopelessly diseased cases. Unfortunately, many of these cases are sent to health resorts either through a misapprehension of what can be accomplished for them or through failure to realize the extent of the involvement.

A complete directory of institutions and societies dealing with tuberculosis has been compiled by Lilian Brandt. It is published by the Charity Organization Society of New York and the National Association for the Prevention and Study of Tuberculosis. The directory contains full information as to the situation, means of reaching, and cost of maintenance at the Sanatoria in the United States and Canada.

While climate has been relegated to a secondary place in the treatment of pulmonary tuberculosis, *surgical tuberculosis*, particularly in children, seems to be most favorably affected by residence at the seashore. The advantages of a stay at the seashore in the treatment of surgical tuberculosis have long been recognized by French physicians, and there are at present a number of institutions in France devoted exclusively to this form of the disease.

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[1] American Medicine, August 26, 1905

Until very recently there was no institution of this kind in this country. Recognizing the importance of the subject the Society for the Improvement of the Conditions of the Poor in New York City has established a seaside camp at Coney Island for the treatment of this class of cases.

Wallace[1] has recently published a preliminary report on the first year's work at this camp. The four factors in the treatment are: 1. Sea air, night and day. 2. Cheerful, normal surroundings. 3. Ample, nourishing food. 4. Orthopedic treatment. The results so far are most encouraging. Wallace states that he feels that it has been proven beyond any question that out-of-door treatment in surroundings normally adapted to child life is more effective than the best possible treatment in wards, and that fresh air is as essential in surgical tuberculosis as it is in pulmonary tuberculosis.

While it remains to be proven whether out-of-door salt air is more efficacious than out-of-door inland air, he believes that the time will come when there will be a number of these seaside hospitals in America.

Otis[2] recommends change of climate in the treatment of *chronic bronchitis*. He states that if the condition is not checked each succeeding winter finds the cough more annoying; this readily leads to emphysema, so that in addition to the coughing paroxysms, dyspnœa on exertion, and asthmatic attacks are added to the patient's discomfort. In his opinion the best climate is that which will enable the patient to pass most of his time out-of-doors in a pure atmosphere. For this purpose any region moderately warm, with an equable temperature, an abundance of sunshine, and freedom from chilly winds and dust will do. Dry irritative coughs with scanty expectoration do better when there is some moisture in the atmosphere.

Arellis[3] calls attention to the difficulties in finding a suitable place for sufferers from *asthma*. Thus, some do well in high valleys, others on the plains, while still others have entire freedom in the dust-laden air of a city. The place which will give freedom from the asthmatic paroxysms must be sought for by each individual for himself. Arellis favors special sanatoria rather than any special climate. In these special sanatoria he believes better results can be obtained through therapeutic suggestion and medicinal guidance of the nervous system than in any of the most famous health resorts.

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[1] Medical Record, July 22, 1905.

[2] Boston Medical and Surgical Journal, April 27, 1905.

[3] Münchener med. Wochenschrift, November 15, 1904.

Bürker,[1] from experiments made with rabbits, concludes that the climate of mountains has an unmistakable effect on the blood. The observations were made at an elevation of 6000 feet. The first effect noted was an accumulation of iron and hæmoglobin in the liver and blood. By the second or third week the blood forming organs produce a new supply, the liver takes up its iron, and the blood takes up the hæmoglobin.

Northrup,[2] who has previously advocated fresh cold air in the treatment of *pneumonic conditions in infants,* has again written on this subject. He reports two cases in which the windows of the sick room were kept open day and night. Although poorly nourished and desperately ill, both these children recovered. The advantages claimed for fresh cold air by Northrup are that it stimulates the heart, improves digestion, quiets restlessness, and aids in overcoming the toxæmia. The following directions "How to kill a baby with pneumonia" are so forcible that I give them in full: Crib in far corner of room with canopy over it; steam kettle; gas stove (leaky tubing); room at 80°; many gas jets burning. Friends in room, also the pug dog. Chest tightly enveloped in waistcoat poultice. If child's temperature is 105° make a poultice thick, hot, and tight. Blanket the windows, shut the doors. If these do not do it, give coal-tar antipyretics and wait.

The fresh-air treatment of bronchopneumonia in children was mentioned in last year's PROGRESSIVE MEDICINE, p. 319.

Codeine. A case of codeine habituation is reported by Pelz.[3] He believes this is the first true case of codeine addiction to be recorded.

Dichondra. Aramian[4] claims that the extract of dichondra will completely destroy *diphtheria bacilli* within two to five days, and that furthermore it has no irritative or caustic effect on the throat, and swallowed even in large quantities, produces no ill effects. The extract of dichondra is obtained from the seeds and stems of the *Dichondra brevifolia,* and is a thick liquid of a dark-brown color, having a slightly bitter taste.

What Aramian terms *antidiphtherin* is a solution composed of one part of this extract and three parts of glycerin. He advises the use of the antidiphtherin with antitoxin, as it will kill the bacilli and thus hinder the further production of toxin. In addition it will make the throat germ free and thus shorten the period of isolation, which is often unduly prolonged.

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[1] Münchener med. Wochenschrift, February 7, 1905.

[2] Medical Record, February 18, 1905.

[3] Deutsche med. Wochenschrift, June 1, 1905.

[4] Medical Record, March 4, 1905.

Diet. Contributions on the subject of diet in the treatment of disease have been unusually numerous during the past year. For some time past there has been a growing tendency toward a more liberal diet in *typhoid fever*. The long-accepted belief that a diet consisting mainly of milk should be the principal food in typhoid fever has become so firmly implanted in the minds of the profession that the suggestion of any departure from it is looked upon as the height of folly.

Nichols[1] has contributed an article on the history of the dietetic methods in typhoid fever. As a result of this study he finds that the feeding of typhoid fever patients has been largely empirical and has not been guided by the scientific principles which have characterized the feeding of infants. He furthermore states, that while from time immemorial solid food has been regarded as totally inadmissible in fever, the idea is erroneously based on the belief that solid food is less digestible than liquid food, more irritating to the intestines, goes through the alimentary canal in a more solid and bulky form, or in some occult manner augments the disease process in a way that a corresponding amount of liquid food will not.

These theories he believes are open to criticism. In his opinion well-divided solid proteid food is as easily digestible as the liquid proteid of eggs or milk, as both kinds of proteid have to go through exactly the same digestive process before they can be absorbed. For this reason he asserts that meat and eggs are certainly no more, rather much less, provocative of intestinal indigestion and fermentation than milk.

In another article on the dietetic management of typhoid fever Nichols[2] considers the various articles of food which may be used. Studied from the standpoint of nutritive value, digestibility, palatability, and innocuousness, he believes that the dietary of the typhoid patient may be made up from the following articles: milk, cream, soup, broths, eggs, custards, ice-cream, meat, chicken-jelly, wine-jelly, rice, cereals, milk-toast, cocoa, and alcohol.

While soups are mentioned Nichols is not particularly in favor of them because of their low nutritive value. He sees no reason why eggs should not be served in the form most palatable to the patient, that is, soft or hard boiled, scrambled or raw. In using red meats care should be exercised to see that the indigestible parts are thoroughly removed. From a study of the literature he finds that no one who has used a varied dietary in the management of typhoid fever condemns it, and that all are agreed that it in no way increases the tendency to hemorrhage, perforation, tympanites, diarrhœa, or relapse.

From a personal experience with a more or less liberal diet in typhoid fever and from a review of the papers of others who have used similar methods Nichols states that the results yielded have been highly satisfactory and most gratifying. The patient's strength, nutrition, and general condition seem to be better maintained; they are more comfortable and contented, and suffer less from hunger, especially the distressing hunger ordinarily present in the early convalescent period.

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[1] Medical Record, July 29, 1905.

[2] American Medicine, May 6, 1905.

Hare[1] advocates a semisolid diet after the first week in typhoid fever. It is his practice to give one to two soft-boiled eggs daily in addition to the daily allowance of milk and to further vary the diet by the use of curds-and-whey, rice boiled to a pulp, barley-, wheat-, and oatmeal-gruel, and a cup of corn-starch with vanilla of other flavoring substance. Owing to the lack of secretion of gastric juices Hare recommends hydrochloric acid and pepsin when proteids are given and taka-diastase and pancreatin when carbohydrates are used. Beef-tea he condemns as being an excellent culture medium and also because it frequently increases tympanites and diarrhœa, the stools becoming fetid under its use.

As a result of his experience with a more liberal diet Hare has seen very little of the marked ataxia common in the convalescent period of typhoid fever, and furthermore the nutrition is so well preserved that in many cases emaciation is no more marked than in many cases of croupous pneumonia. Secondary complications such as furuncles and bed sores are extremely rare, as the vital resistance is maintained so well that simultaneous collateral infections do not take place.

Johnston[2] is another recent advocate for a more liberal diet in typhoid fever. In an experience with 105 cases, 51 of which were treated in the generally accepted manner and 54 with a liberal diet, he found that the latter were less toxic, were no more emaciated than the other cases, and made a quicker convalescence. In the series treated with a liberal diet there were but three relapses, no perforations, and few hemorrhages. Johnston states that there are three periods in typhoid fever in which the question of diet must be determined: first, the toxic period, when there is complete anorexia or even repulsion for food; second, the period of reaction from toxic effects, when the appetite returns but fever is present; third, the period of convalescence, when the appetite is clamorous and the fever is disappearing or gone.

In the first period Johnston gives every twenty-four hours twelve ounces of peptonized milk well diluted with water and the albumen (whites) of two eggs in six ounces of normal salt solution (the salt solution was not insisted on if distasteful, but was given to aid in counteracting the toxæmia). The milk and albumen-water were given at three-hour intervals. Should vomiting, tympanites, or diarrhœa be present or hemorrhage occur all food was stopped until these complications had disappeared.

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[1] Therapeutic Gazette, September 15, 1904.

[2] Pennsylvania Medical Journal, March, 1905.

During the second period, in which there was a return of the appetite, coffee, tea, steamed broths, albumen-water, milk, buttermilk, koumis, beef-juice, orange-juice, etc., were given in suitable quantities every three hours. When the temperature had been normal for a full week and the appetite vigorous, even if the tongue was not entirely clean, eggs, oysters, custards, junket, toast, and a gradually increasing solid diet was allowed.

Thompson[1] is opposed to the continuance of a milk diet in typhoid fever until convalescence has been thoroughly established. This practice, he believes, not only protracts the convalescent period but by impoverishing the nutrition renders the patient far more susceptible to complications such as thrombophlebitis, neuritis, furunculosis, etc. It is now his rule to begin with semisolid food on the day on which the temperature first reaches normal. He employs soft-cooked eggs, baked custard, junket, milk-toast, mutton- or chicken-broth thickened with rice or crackers, plain gelatin foods, like blanc-mange and wine-jelly, and light farinaceous foods, such as farina and boiled rice with beef-juice. On the third day, if convalescence is uninterrupted, a scraped beef-sandwich is given.

This writer recommends this increase in the dietary, as soon as the temperature first becomes normal, in very mild cases in general, and in any case in which the patient has a fairly clean, moist tongue, a soft abdomen, stools which are nearly normal in consistency, a clear mind and eye, and no serious complication. Such a diet should be avoided, however, if there be much tympanites, diarrhœal stools, or recent severe hemorrhage.

Thompson states that there is another class of patients in which the main danger is in the rapid loss of nutrition. In this class while the temperature remains low (101° to 102°) the loss of weight is rapid and emaciation and asthenia becomes most pronounced. In order to prevent complications in these cases a better nutrition is imperative. In these cases he abandons milk altogether or gives it in a predigested form reinforced with beef-juice, white of an egg, milk-sugar, orange-juice, and light farinaceous gruels. Semisolid food is also administered before the temperature is actually normal. He also calls attention to another group of cases in which the febrile course is of considerable severity. In these cases the temperature remains normal or subnormal for an hour or two each day, but rises again to 100° or 101°, the fluctuations continuing into the fortieth or fiftieth day without any discoverable complications. In this class semisolid food is a necessity and often results in a normal and uniform temperature within twenty-four hours. Thompson insists that the best guide in feeding a typhoid patient is not the temperature alone but rather the state of digestion and the general condition as evidenced by the appearance of the tongue, the abdomen, the stools, the appetite, and the feces. He also recommends the abandonment of milk and the substitution of beef-juice, egg-albumen, and broths in tympanites or any other manifestation of indigestion.

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[1] Medical Record, December 10, 1904.

Edsall[1] states that a possibly frequent source of severe diarrhœa in typhoid fever may be the milk. In a recent experience he was led to investigate the purity of the milk, believing that it was possibly the cause of an otherwise unexplainable diarrhœa. His suspicions proved correct, and with Pasteurization of the milk supply the diarrhœa subsided.

The question of diet in *pulmonary tuberculosis* has been well treated in a series of three articles in the *Practitioner* for January, 1905. The first article, by Philip, on zomotherapy has been the subject of considerable editorial comment, and while his claims for it are most enthusiastic, the treatment has never met with much favor, particularly in this country. He gives the meat either minced or bruised, slightly seasoned with salt, three times a day, in half-pound quantities. It may be served cold or gently warmed, according to the taste of the patient. The meat must be absolutely fresh. Freshly prepared beef-juice and even beef-soup are also recommended.

The beef-juice is prepared as follows: Extract one-half pound of meat in one-half pint of cold water plus one-half teaspoonful of salt, and slowly heat to 100° F. Express the liquid through a cloth and serve. The juice may also be expressed through a cloth without the addition of water.

The raw beef soup is prepared by mixing one-half pound of finely minced fresh meat with sufficient milk to produce a thick uniform paste. Immediately before serving add one-half pint of milk at 150° F.

Philip claims for this diet that it favorably influences all untoward symptoms, such as temperature, pulse rate, anæmia, etc., and that in addition it yields excellent gains in weight, the gain being the result of increased musculature and not fat. His best results were obtained in the early cases. It is to be borne in mind, however, that early cases, providing they have an abundance of fresh air and avoid overexertion, will do well on any wholesome diet.

Galbraith[2] has also contributed an article on zomotherapy which is favorable to its use in pulmonary tuberculosis.

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[1] Pennsylvania Medical Journal, March, 1905.

[2] Practitioner, February, 1905.

Burton-Fanning and Latham[1] are both in favor of a diet consisting entirely or in part of milk. I think most will agree with Burton-Fanning that milk is the sheet-anchor in the treatment of pulmonary tuberculosis, and that it is by varying the quantity of milk that we can most readily affect the ordinary patient's weight.

Latham divides tuberculous cases into two broad classes: 1. Those who have sound digestion and who are able to take exercise. 2. Those who are suffering from high fever or any disorder of digestion. The first class may be given an ordinary wholesome diet reinforced by a quart to a quart and a half of milk daily. In this class the vast majority of incipient cases will be found, and as great losses of weight are unusual in these patients the maintenance of a good nutrition rather than great gain in weight is the object desired.

The second class of Latham, namely, those with high fever and a disordered digestion or other marked constitutional symptoms, milk should be the staple diet. Latham in his article refers to the beneficial use of alcohol when fever is present. The use of alcohol in pulmonary tuberculosis is not recommended in any stage of the disease by the best authorities in this country.

There is an aspect of the food question in tuberculosis which has not been sufficiently dwelt upon, namely, that of cost. Admitting all the advantages claimed for zomotherapy the treatment would still be out of the reach of fully 90 per cent. of tuberculous patients because of the cost of good fresh meat. On the other hand, admitting that milk has less value as a food than is claimed for it, its cheapness and the fact that there is no waste, puts it within the reach of all patients. Practically every article of diet, except milk, contains a varying proportion which from one reason or another goes to waste; the quantity of milk, however, which goes to waste is practically nil.

In the treatment of *heart disease* Schott[2] warns against allowing the patients to eat food which produces flatulency. The flatulency proves harmful in three ways: 1. By pressing the diaphragm upward against the lungs and thus impeding respiration. 2. By pressing the heart upward and outward so that its action is carried on with difficulty. 3. Intra-abdominal pressure is increased and the abdominal vessels compressed. It is also for these reasons that effervescing beverages, carbonated waters, champagne, and beer are frequently harmful in patients suffering from heart disease.

Schott recommends that the food be taken in small quantities at three-hour intervals in order to avoid overloading the stomach and that the last meal be eaten at least two to two and a half hours before retiring, otherwise there is danger of disturbed sleep.

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[1] Loc. cit.

[2] Lancet, 1904.

Freshly made bread or cakes are to be avoided; toast, zwieback, and the crust of rolls are allowable. Beans, peas, lentils, sauerkraut, cabbage, onions, garlic, and celery are to be avoided as being indigestible and also because of their tendency to produce flatulency. Potatoes boiled or in the form of a purée are excellent, as are also young turnips and carrots. Meats are permissible with the exception of fat goose breasts, goose livers, fat ham, bacon, and sausages. Smoked or salted fish is to be avoided because of the thirst it produces. Rich sauces, dressings, seasonings, and spices must not be used. Raw or stewed fruits are allowed, with the exception of raspberries, gooseberries, currants, cranberries, or pineapples. Ice in any form must be used cautiously, as it is prone to produce gastrodynia or congestion of the liver. This fact should be kept in mind in prescribing ice for vomiting.

The diet best adapted for *nephritis* is one of considerable importance, and must be kept constantly in mind in the management of the disease. In the treatment of the acute forms of the disease it is pretty generally agreed, as Jackson[1] states, that the diet must be cut down to the lowest point compatible with the maintenance of a fair degree of nutrition and that this diet should be one suitable for an acute febrile disease. The same rule holds true for acute exacerbations of the chronic forms. The general rules for the management of the chronic type of nephritis as given by Jackson are as follows: Highly seasoned foods are to be avoided; the food should be simple, nourishing, and moderate in quantity. Owing to the nutritive value of fats patients should be encouraged to eat as much butter and cream as can easily be digested.

As an example of the proper diet is the following: Breakfast—cereal with cream, egg, bread and butter, very weak coffee (with a great deal of cream), a glass of milk, and fruit. Dinner (preferably in the middle of the day)—a little soup, fish, slice of meat, and one vegetable; the dessert may consist of fruit or simple puddings. Supper—cold meat, broiled fish, bread and butter, and milk.

Jackson also calls attention to the recent French views regarding the dechloridization treatment of nephritis and to the observations of von Noorden and others who have shown that chemically there is little essential difference between the red and white meats. Red meat, which for years has been looked upon as harmful in nephritis, is now considered by many as a perfectly safe and even necessary article of food.

Thompson,[2] in writing of the dietetic treatment of nephritis, dismisses the acute forms, with the statement that an exclusive milk diet, bread and crackers with milk or farinaceous gruels are demanded. In the management of the chronic forms it is his belief that the dangers of eating meats are overrated and that there are certain types of the disease in which the moderate use of meat is positively demanded.

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[1] Boston Medical and Surgical Journal, April 6, 1905.

[2] Medical Record, December 10, 1904.

Thompson recommends red meat sparingly in the following cases: 1. Those of long standing in which the chief symptom is a moderate albuminuria. 2. Those in which anæmia and loss of weight and strength are the prominent features. 3. Those in which some associated disease makes the use of animal food desirable. In regard to this last class Thompson states that the dominant condition is the one to be considered, even though it may disregard the nephritis. Thompson[1] also considers the dietetic management of arthritis deformans, diabetes, lithæmia, arteriosclerosis, and gout. Numerous drugs have been recommended in the treatment of *arthritis deformans*, but, as Thompson states, the disease is best combated by dietetic measures. Forced feeding, as carried out in tuberculosis, gives the best results in these cases. The diet should consist largely of fatty foods with an abundance of meat to combat the anæmia. The ordinary meals should be reinforced by two or three lunches during the day, at which milk, eggs, broths, or meat-sandwiches are given. The digestion of these patients is not unusually impaired, but with care they will usually tolerate the forced feeding. Gastrointestinal disturbances can usually be corrected by the use of simple bitters before meals, hydrochloric acid, and nux vomica after meals, and the promotion of waste elimination by the use of a saline. An abundance of fresh air and sunshine is also of great benefit in arthritis deformans.

While not admitting the existence of *lithæmia* as a separate disease Thompson admits that there is a symptom-complex which renders the use of the term convenient. He pictures the lithæmic patient as one usually in middle life who, after leading an in-door or sedentary life, or after passing through a period of excessive mental strain and anxiety (especially of "worry"), complains of headache, insomnia, vertigo, "nervousness," irritability, and lassitude. They are constipated, have a furred tongue, and the urine, somewhat diminished in quantity, is loaded with proteid waste. The pulse is often small and hard. The history of the patient reveals the fact that he has been eating meat twice daily and sometimes three times. Thompson states that the treatment of this condition is simple and the results most satisfactory. Meat is prohibited absolutely for a week or ten days and the dietary made up from green vegetables, cereals, and fruits. Water is given freely; two glasses on rising, before each meal, and on retiring (sixty-five ounces in all) are sufficient. If a mental effect is desired some one of the well-known spa waters may be prescribed or an effervescing tablet of lithium carbonate may be added to each glass of water. Exercise is needed but should be taken in moderation, so as not to add physical to the mental exhaustion. The patient should also be instructed to spend as much time as possible in the open air, eat slowly, and lie down for half an hour before the principal meal of the day.

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[1] Loc. cit.

The dietetic management of *arteriosclerosis* is substantially the same as that of lithæmia. As the condition is not unusually met with in laboring men, rest before meals can hardly be advised. In these cases catharsis and diuresis to carry off waste products, regulation of the diet, and the drinking of more water and less alcohol is possible. If the arteriosclerosis is complicated by cardiac dilatation or myocarditis or by nephritis restriction of fluids in the former and an increase in the intake of fluids in the latter may be necessary.

Thompson believes that the rigorous diet formerly in vogue in the management of *diabetes* is not generally used at present. He is opposed to the various gluten substitutes for bread because they are unreliable and fail to satisfy the craving of the diabetic for bread. For these reasons it is best to allow the patient one or two thin slices of thoroughly toasted bread once or twice daily or a small baked potato. The potatoes are best given in the form of "Saratoga chips," as they apparently give more satisfaction to the patient, and besides, are cooked in fat.

It is his custom in a well-marked case to advise a total abstinence of starch and sugar for several weeks, and as the glycosuria subsides a small quantity of bread or potato may be given. Thompson believes in a limited amount of bread or potato, as the patient is less apt to commit harmful indiscretions. A mild case will do well on a diet principally of proteids with some carbohydrates and fat added, but in the more serious cases the amount of fat should be increased. In the most serious aspects of the disease when with an exclusive diet of proteids glucose continues to appear in the urine both the proteids and carbohydrates should be greatly reduced and fats increased as far as possible. The following dietary of fats is recommended for extreme cases: Butter (one-quarter pound daily), cream (one pint or more daily) diluted with water, cod-liver oil, olive oil, nuts of various kinds, sardines, eggs, bacon, fat ham, cheese, soups enriched with "dripping," mackerel, salmon, fat meat, such as goose and duck, and the tender fat of corned beef. Suet and lard should be freely used in cooking.

Gout, Thompson says, has had too many dietetic fads connected with it. While acute attacks of gout demand a simple dietary of milk and Vichy with simple gruels, the prophylactic treatment and the treatment of the chronic manifestations are best carried out on the following general principles: 1. To reduce the consumption of food as a whole. 2. To increase the consumption of water. 3. To eliminate entirely sugars and sweets of every kind, as well as alcohol. 4. To reduce the consumption of red meats to a minimum. The common belief that Scotch whiskey is less injurious to a gouty individual Thompson characterizes as a fad. He states that much of the Scotch whiskey sold in this country is artificially flavored with creosote, and besides is quite as injurious as any other form of alcohol.

Watson[1] has carried out some experiments to determine the influence of an excessive meat diet in the production of *gout.* An exclusive raw meat and water diet fed to poultry and rats resulted in an hypertrophy of the thyroid gland and an alteration in the character of the secretion from the gland. He believes that as a result of an excessive meat diet there is established in many subjects an alteration in the character of the thyroid secretion, and that this defect can be remedied by the administration of thyroid gland. In fact, in two cases of inveterate chronic gout which had not been amenable to dietetic measures he obtained strikingly beneficial results from the administration of *thyroid extract.* In the treatment of chronic types of disease, especially those generally designated as gouty, rheumatic, or neurotic, Potts[2] recommends a purin-free diet. In this class of patients he would avoid meat, fish, tea, coffee, mushrooms, and asparagus as being the ones which contain purin bodies in an appreciable amount. He states that it must be remembered that though a vegetarian diet may be made purin-free, it is not the most desirable, as nutrition and vigor are maintained with difficulty. The staple food should be selected from milk, cheese, nuts, cereals, and fruit. Thorough mastication must be insisted on and the change in food must be made gradually, not more than one meal being altered at a time. The patients should be under constant supervision during the early days in order to avoid constipation and difficulty in digesting certain foods.

In the treatment of excessive *uric acid* in the urine Byron Robinson[3] states that the diet should be mixed and for the most part vegetable in character. Cabbage, cauliflower, beans, peas, turnips, radishes, and spinach should be freely eaten in order that the sodium, potassium, and ammonium which they contain may combine with the free uric acid in the urine and form soluble urates. In addition Robinson uses an alkaline laxative tablet.

Additional information on dietetic measures in tuberculosis and skin diseases will be found in the present volume, pp. 39, 41, and 108.

Digitalis has occupied considerable space in the literature without, however, anything new being brought forward. Bradford[4] calls attention to certain points which are too apt to be neglected. He states that digitalis will not always produce slowing of the pulse, as this property of the drug depends entirely on the cause of the acceleration. In febrile conditions it has little influence in slowing the pulse, and the same may be said of acceleration due to nervous excitement. Its great field in reducing the pulse rapidity is in those conditions resulting from disease of the muscular mechanism of the heart.

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[1] Lancet, February 11, 1905.

[2] American Medicine, August 26, 1905.

[3] Ibid., June 17, 1905.

[4] Clinical Journal, July 27, 1904.

Eichorst[1] believes that digitalis is indicated in any condition in which there is enfeeblement of the cardiac muscle such as valvular disease, myocarditis, chronic respiratory diseases, atrophic kidneys, acute infections, poisons, such as tea, coffee, tobacco, and emotional disturbances. He prefers the powdered digitalis in 1½-grain doses given with 15 grains diuretin three times daily. In some cases simple rest in bed with a milk diet is sufficient; if the heart does not respond in three days, however, he adds digitalis. He ordinarily employs the digitalis for ten days, but in certain cases continues it indefinitely in small doses.

Rouslacroix[2] in chronic diseases of the heart starts with the "digitalis test" (25 drops). If the myocardium does not respond to this test sparteine and strophanthus are used alternately for a week. After the heart has been steadied by this treatment digitalis is used in two large doses, and this is followed by rest and a milk diet. If the heart again fails the sparteine and strophanthus are resumed, followed by the digitalis. He cites instances showing how digitalis had failed at first and later had exerted its specific effect after the use of sparteine and strophanthus. Rouslacroix used digitalin, 1 mg. of the active principle being contained in 50 drops of an alcoholic solution.

Jones[3] believes that the indications for digitalis in valvular disease are very limited. He says it should not be used in aortic regurgitation. While most observers state that digitalis is contraindicated in aortic insufficiency except in failing compensation, Jones states that it should not be used even then. He states that after careful study he is convinced that digitalis should be used in mitral insufficiency only, and then not until compensation has failed.

In the treatment of *pneumonia* Capuano[4] advocates large doses of digitalis. Amucano[5] believes digitalis is valuable in pneumonia because it increases the resisting power of the leukocytes. Manges,[6] on the other hand, in writing on the treatment of pneumonia, states that the use of digitalis in large doses has not found much favor.

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[1] Deutsche med. Wochenschrift, 1905, No. 2.

[2] Presse médicale, 1905, No. 1.

[3] Journal of the American Medical Association, October 1, 1904.

[4] Gazetta degli Ospedali, 1904, No. 100; Abstract, Journal of the American Medical Association.

[5] Ibid., 1904, No. 49.

[6] Medical Record, December 10, 1904.

Digitalis, as is well known, should be used cautiously in *arteriosclerosis*. Von Openchowsky[1] reports a rather unique case in which as the result of disease of the right coronary artery the administration of digitalis produced marked disassociation in the action of the two ventricles.

Hall[2] calls attention to the frequency of hallucinations and delirium from the administration of digitalis. He believes that these symptoms are usually attributed to the disease from which the patient is suffering, when, as a matter of fact, the withdrawal of the drug will have the effect of abating the mental disturbances. He advises in all heart cases before deciding that the delirium is the result of the disease to first see what effect withdrawal of the drug will have.

Johnson[3] records an instance of *digitalis poisoning* with low temperature without collapse. The patient, a woman, took two doses of the tincture, the amount of which was unknown. A few minutes after the second dose there was vomiting, diarrhœa, and epigastric pain. The pulse was 54 and the temperature 94°. The temperature remained low for several hours, but there was no air hunger, sweating, or weak pulse. She recovered under active stimulation.

Ergot. Clinically ergot is supposed to exert a marked influence on the bloodvessels, causing a persistent contraction. From an experimental investigation on animals, chiefly dogs, Sollman and Brown[4] found that there is nothing pointing to a useful therapeutic action in modifying the circulation. This statement, however, is based entirely on experimental evidence, and the writers do not wish to be understood as denying the existence of the good results claimed by competent clinical observers.

Applegate[5] believes in the use of ergot in *labor*. In his opinion it should be limited to or near the end of the third stage. It is best administered by mouth for the prevention of hemorrhage, while for the control of hemorrhage it should be given hypodermically.

Prüssman[6] is also an advocate of the prophylactic use of ergot in labor. He employs *ergotine* hypodermically ten to fifteen minutes before the birth of the child. Prüssman advises the use of ergotine in all operative deliveries, multiple births, hydramnios, deformities, fibroid tumors, and in the first or second stages of labor when the pains are deficient or there is a history of hemorrhage during previous labors.

It has not been so many years ago that the almost universal teaching and practice was to administer ergot at the beginning of the third stage of labor.

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[1] Berliner klin. Wochenschrift, 1904, No. 40; abstract, Journal of the American Medical Association.

[2] American Medicine, March 25, 1905.

[3] New York Medical Journal, May 13, 1905.

[4] Journal of the American Medical Association, July 22, 1905.

[5] American Medicine, June 24, 1905.

[6] Münchener med. Wochenschrift, January 10, 1905.

Hare,[1] in commenting on this practice, points out that obstetric teachers are coming more and more to recognize the fact that labor is a physiological process and that the ordinary healthy woman has no need of such artificial aids. Furthermore, there is danger of locking up in the uterus clots and other materials which would be otherwise expelled; another point to be borne in mind is the fact that the ergot when given at the beginning of the third stage probably does not exert any influence until some time later, when it only serves to aggravate and increase the "after pains" by the powerful uterine contractions. Its employment to overcome *uterine inertia* is not good practice, as it may produce serious damage from the powerful uterine contractions. Besides, there are other methods of overcoming uterine inertia which are perfectly safe, namely, the hypodermic use of strychnine or by the use of a little cocaine or the wine or fluid extract of kola. These substances act by stimulating the exhausted system and thus furnish sufficient energy to complete the physiological process.

Hooper,[2] in an article on ergot, takes practically the same stand, and while he would not entirely discard it the occasions when he would use it would be very few. Hooper calls attention to a practical point in regard to hemorrhage during labor, and that is the necessity of ascertaining its source. He cites instances where torn vessels in the cervix, clitoris, vagina, or perineum were the sources of the hemorrhage. He cautions against the use of ergot in patients with renal inadequacy, albuminuria, or a diminished output of urea.

Eustace Smith's[3] plan of treating *chorea* with large doses of ergot was commented on last year. Riviere[4] writes favorably of this method. The fluidextract of ergot was given in doses of a drachm to a drachm and a half three times daily. Riviere states that there were no symptoms of poisoning from these doses nor did he detect any physiological effects, such as arterial spasm, increase of pulse tension to palpation, or accentuation of second aortic sound. This by the way is in confirmation of the experimental results obtained by Sollman and Brown.[5] Riviere found that still better results were obtained by adding 3 minims of liquor arsenicalis to each dose of the ergot. The *arsenic* can be increased as desired.

Chase[6] asserts to have obtained good results from the internal use of ergotine in the treatment of *cerebrospinal meningitis.* In case of vomiting he gave the drug hypodermically. The average dose employed was 3 grains (equal to 30 grains of ergot) every hour.

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[1] Therapeutic Gazette, September 15, 1905.

[2] Australasian Medical Gazette, February 20, 1905.

[3] PROGRESSIVE MEDICINE, December, 1904, p. 323.

[4] British Medical Journal, February 18, 1905.

[5] Brooklyn Medical Journal, November, 1904.

[6] Loc. cit.

Eserine has long been recognized as a drug possessing some value in preventing *meteorism* and *intestinal paresis.* Craig[1] has found it very useful in the after-treatment of *abdominal sections.* He recommends it in form of the salicylate in $\frac{1}{60}$ gr. doses, which may be repeated if necessary, or if there has been chronic constipation the dose may be doubled or trebled. Craig advises that *atropine* be used in conjunction with the eserine, as the former antagonizes the undesirable effects of the latter. One one-hundredth of a grain of the atropine is given by mouth an hour before the anæsthesia, first because it is slower in action than the eserine, and secondly, because it is an aid to the anæsthetist in that it prevents excessive pharyngeal secretion so common during the early inhalations of the ether. If there is not time to administer the atropine by mouth $\frac{1}{50}$ grain is given hypodermically immediately before the anæsthesia. He advises the use of a fresh solution of eserine, as many of the stock tablets were found to be inert.

Since he has been using eserine Craig has had to use less morphine or codeine for pain unless it was distinctly extra-abdominal. In such cases the morphine can be used with greater freedom, as there is less danger of producing constipation.

Formaldehyde. This substance is at present largely used as a disinfectant and preservative and is little employed medicinally. Fischer[2] from experimental observations states that *formalin* (40 per cent. formaldehyde) is an extremely irritant poison capable of producing a destructive action upon all of the viscera with which it comes in contact, and that no matter how it is introduced into the body (whether by direct injection or inhalation) it will produce a mild or severe degree of cloudy swelling in the parenchymatous organs. He also states that the inhalation of formaldehyde vapor, even in small quantities, is followed by bronchitis and pneumonia, the latter being due to the inhalation and not to secondary infection. While these observations may be perfectly true in regard to animals, the inhalation of formalin vapor certainly does not produce bronchitis or pneumonia in man. On the contrary I have employed during the past year formalin inhalations in the treatment of coryza and the early stages of bronchitis with very good results. In the early stages of a "cold," when the nasal mucous membrane is swollen, accompanied by a feeling of fulness in the head and the throat is dry and irritated, the use of a gargle (composed of chlorate of potassium and tannic acid) and formalin inhalations not only give great relief but will not infrequently abort the attack.

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[1] New York Medical Journal, March 18, 1905.

[2] Journal of Experimental Medicine, February, 1905.

The formalin inhalations are given as follows: Ten drops of formalin are placed on a piece of absorbent cotton and the vapor gently inhaled through the nose. This amount of formalin will give off vapor for from eight to ten minutes. The cotton may be wrapped about the end of a pencil or penholder and should be about the size of an English walnut. The inhalations are given night and morning. Prolonged exposure to the vapor of formalin will often produce headache, but I know of no case of bronchitis or pneumonia among pathological workers where exposure often lasts several hours.

Rosenberg[1] does not believe formaldehyde to be a highly poisonous or corrosive substance. He states that when properly administered, so far from having any harmful effect, it usually proves beneficial. It is best administered in tablet form, each tablet containing 1 cg. in combination with sugar, menthol, and a little pepsin, hydrochloric acid, and aromatic vehicle. The tablet should not be swallowed whole but taken either in solution or held in the mouth and chewed.

Rosenberg claims to have obtained good results from the drug in *diphtheria*, *scarlet fever*, *erysipelas*, *cystitis*, and *tonsillitis*. He has also had some success with it in *tuberculosis*, and thinks it might be used with advantage in typhoid fever.

Galewsky[2] has made a study of the changes in the skin and nails following exposure to formaldehyde. The changes occurred mostly in laboratory workers and usually followed long after the exposure to the formalin; in some instances six to nine months elapsed between the exposure to the formaldehyde and the appearance of the lesions. The first change noted was a brownish discoloration of the nails followed by softening, painful splintering, and thickening in the neighborhood of the matrix. The changes may be limited to the nails or involves the skin in the form of an eczematous eruption which may extend as far as the wrist-joint. The skin eruption is accompanied by inflammatory œdema and vesicle formation. The nail changes in ordinary eczema differs from the above in that the nails are hard and brittle. Pain of a burning and boring character in the ends of the fingers and nails was complained of by most of those affected. The condition may last for as long as a year or even longer. As formalin has been recommended in the treatment of hyperidrosis care should be exercised lest this obstinate affection is produced.

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[1] Therapie der Gegenwart, 1905, No. 2.

[2] Münchener med. Wochenschrift, January 24, 1905; abstract, Journal of the American Medical Association, 1905.

Hamamelis Virginiana. Coston[1] recommends this drug in a variety of conditions. He states that it is a tonic, astringent, hæmostatic, antiseptic, and vascular sedative.

As a local application it is of value in *sprains, bruises, fissure in ano, ulcers,* and *varicose veins, phlegmasia alba dolens, eczema,* and the *poison of toxicodendron.* It is also of value in the treatment of cases of *capillary oozing.* For the treatment of sore and bleeding gums, relaxed uvula, or oval ulcers the following formula is recommended:

℞—Ext. hamamelidis,
Aquæ rosæ . . . . āā f℥iv.
M. Sig.—To be used as a mouth wash.

Owing to its sedative properties it may be used with advantage as a dressing for burns, herpetic eruptions, and articular rheumatism; in the latter instance it is applied with thorough friction. Its astringent properties render it of service in the treatment of hyperidrosis.

In the treatment of ulcers and varicose veins Coston recommends the fluidextract in full strength or combined with one-fourth the amount of glycerin or olive oil. For congested hemorrhoidal vessels hamamelis is of service in the form of a suppository.

℞—Ung. hamamelidis,
Ung. stramonii . . . . āā gr. x.
Ol. theobromæ . . . . q. s.
M. Ft. suppos. No. i.
Sig.—One such suppository night and morning after cleansing the bowels.

Adler[2] recommends hamamelis locally for *pruritus ani.* The drug is used as follows:

℞—Ext. hamamelidis . . . . f℥j.
Ext. ergotæ fl. . . . . fʒij.
Ext. hydrastis fl. . . . . fʒij.
Tr. benzoini co. . . . . fʒij.
M. Sig.—1 to 2½ drachms to be injected into the rectum once daily.

In the treatment of this very obstinate condition the exciting cause must be removed if possible and the patient's general condition improved by hygienic and dietetic measures. Adler further points out that if the perineal skin is tough and dry the entire surface should be painted over with a concentrated solution of silver (96 grs. to the ounce). This application may have to be repeated several times. After the skin has been restored to the normal citrine ointment should be applied in full strength daily for two weeks and then two or three times a week. The treatment may extend over a period of several months. Coston[3] states that hamamelis is valuable internally in the treatment of *hæmoptysis, hæmatemesis, menorrhagia, metrorrhagia,* and especially *hæmaturia* in half-drachm doses. In hæmatemesis it may be combined with a solution of adrenalin while in hæmoptysis it may be used to advantage with ergot and digitalis.

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[1] Therapeutic Gazette, 1905.

[2] American Medicine, 1905.

[3] Loc. cit.

Hamamelis is recommended by Shoemaker[1] in cases of acute *dysentery*. He prescribes it as follows:

℞—Ext. ergotæ fl.,
Ext. hamamelidis fl. . . . . . . āā f℥iss.
Elix. guaranæ . . . . f℥ij.
M. Sig.—Two teaspoonfuls in water every two or three hours.

He has also found the hamamelis ointment serviceable in the treatment of *burns*, *erysipelas*, *eczema*, and *herpes*.

Heroine. Two cases of heroine addiction, one reported by Atwood[2] and the other by Montagnini,[3] are of especial interest inasmuch as this drug has been recommended as perfectly safe and free from the danger of producing a habit. In giving heroine the same precautions should be taken against the renewal of the prescription as are observed with morphine.

Hydrastis has little popularity at the present time and is not much used. W. B. Stewart[4] states that individuals with a poor appetite, slight nausea, and occasional vomiting will do well with proper regulation of the diet and the use of the fluidextract of hydrastis. The drug is given in doses from one to six drops in water an hour before each meal and at bedtime. Small doses of hydrastis are also efficient in *enterocolitis*.

For the control of various hemorrhagic conditions as *menorrhagia*, *epistaxis*, *hæmoptysis*, *hæmatemesis*, and *hæmaturia* Stewart recommends hydrastininæ hydrochloras in doses of one-fourth of a grain. Caution is necessary when employing this preparation in pregnant women, as there is danger of abortion.

At one time quite popular in the treatment of *gonorrhœa*, hydrastis is now little used. For local use Stewart states that the best preparation is the glyceritum hydrastis. Subacute or chronic *vaginitis* or *urethritis* and some forms of leucorrhœal discharges are often greatly benefited. Hydrastis should not be used in the acute stages of vaginitis or urethritis. The glyceritum hydrastis diluted with three or four parts of water forms a very efficient nasal spray in cases of chronic *nasal catarrh*. A decided objection to its use locally is the tendency to staining.

Hyoscine. The remarkable results obtained by hyoscine in the treatment of drug habits were given in PROGRESSIVE MEDICINE December, 1904, p. 326. Wagner[5] has contributed an article favorable to its use.

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[1] Journal of the American Medical Association, March 11, 1905.

[2] Medical Record, June 3, 1905.

[3] La Riforma Medica, August 30, 1904.

[4] Journal of the American Medical Association, November 5, 1904.

[5] Cleveland Medical Journal, June, 1905.

He states that combined with atropine it is antagonistic to the morphine and cocaine habits and will abolish the craving for these drugs in from seventy-two to one hundred and forty-four hours without any suffering or inconvenience on the part of the patient. He cautions against leaving the patient alone and that a nurse should be in constant attendance during the active treatment. A course of rest and tonic treatment should follow the active treatment. Wagner found hyoscine of little value in the treatment of alcoholism.

Iodide of Potassium. Hühner[1] has contributed a very practical article on the best method of administering potassium iodide. He advises that the drug be always given in solution, well diluted, and never on an empty stomach. Milk is the best vehicle for its administration, although compound syrup of sarsaparilla is often preferable for disguising the taste. Any of the mineral waters or ordinary pure water can also be used. Each dose should be further diluted by half a glass of water or milk. Many of the ill effects of the drug may be traced to a poor preparation. It is also to be remembered that while small doses may cause untoward symptoms an increase in the dosage may have no bad effect. Pustulation of the skin may be largely avoided by strict cleanliness of the skin when the drug is taken internally. The well-known fact that calomel should never be dusted in the eye of a patient taking iodide of potash is also recalled.

In regard to the making of a solution of iodide of potash Hühner states that it is a difficult matter to make a solution of which 1 minim equals 1 grain. As druggists are not apt to take the time and trouble necessary he advises the use of a 50 per cent. solution (two drops of the solution equalling one of the drug).

In connection with the question of inaccuracies in the dosage of iodide of potassium in saturated solutions the experience of Healy[2] is interesting. He found that 4 drachms of potassium iodide added to 3 fluidrachms of distilled water gave a mixture of 4½ drachms, but that this at room temperature (70°) was not a saturated solution, as almost another drachm of the iodide of potash could be dissolved. This brought the mixture up to 4 drachms, of which 1 minim was practically 1 grain of the drug. It was in the matter of drops and household measures, however, that the greatest discrepancies were found. Thus measured by a medicine dropper sixty drops equalled from 28 to 40 minims while from an eye pipette sixty drops equalled 46 to 49 minims. While these measures are far below what is ordered, the ordinary teaspoon erred in the opposite direction, one teaspoonful containing from 85 to 95 minims. It will thus be seen that measured in one way but half the required amount of the drug may be given, while by the other method nearly twice as much is taken. As Healy says, under the present methods when it is thought 120 grains are being taken, in reality it may be 110 grains or 90 grains or 160 grains.

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[1] New York Medical Record, April 1, 1905.

[2] Journal of the American Medical Association, January 14, 1905.

Hühner[1] calls attention to a fact that is too little heeded, namely, that iodide of potassium should never be given in tuberculosis or when there is a suspicion that tuberculosis may be present. He states that its irritating effect on the bronchial mucous membrane is a decided objection. It may also be added that there is considerable clinical authority that iodide of potash will cause a rapid breaking down of a tuberculous lung. When syphilis and tuberculosis are present in the same patient the iodide may be used to advantage.

According to Hühner iodide of potassium should never be used in primary *syphilis* nor in the secondary stage until the patient has had at least six months of mercurial inunctions unless tertiary symptoms occur early and threaten some important organ, as the brain or eye. After a patient has been six months on mercurial inunctions the iodide is given as follows:

℞—Hydrargyri iodidi rubri		gr. ss.
Potassii iodidi		gr. cxxviij.
Syr. sarsaparillæ co.		f℥j.
Aquæ	q. s. ad	f℥ij.

M. Sig.—1 fluidrachm three times a day, after meals, well diluted.

After a few weeks with this mixture Hühner prescribes the iodide alone in doses of 10 to 25 grains t. i. d. The mercurial inunctions are kept up at intervals for another six months. The iodide is then administered as follows:

℞—Potassii iodidi		ʒviij to ʒx.
Syr. sarsaparillæ co.		f℥j.
Aquæ	q. s. ad	f℥iij.

M. Sig.—1 fluidrachm in half a glass of milk or water after meals.

When the iodide is given simply for its specific effect and not to counteract any particular symptom the drug is stopped at the first evidence of iodism.

When given to combat the ravages of tertiary syphilis, however, the drug is pushed and not stopped for skin pustulation or rhinitis. Hühner states that under these circumstances an increase in the dose will often cause a disappearance of symptoms of poisoning, and even if they do get worse it is more important to get the system saturated with the iodide than to worry over the pustulation or rhinitis. In giving large doses Hühner pursues the following plan: A 50 per cent. solution is used (2 drops equals 1 gr.). First day 20 drops in the morning, 22 drops at noon, 24 drops in the evening; second day 26 drops in the morning, 28 drops at noon, 30 drops in the evening. By increasing the dose in this way he has rarely seen any ill effects from the drug and seldom has to discontinue it on account of unpleasant symptoms. He states that he has two patients at present taking 500 and 600 grains daily without any annoying symptoms.

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[1] Loc. cit,

In the treatment of *arteriosclerosis* Bar[1] recommends the free use of the iodine compounds and thyroid extract, as they both increase the metabolic activity.

Romberg[2] quotes the work of Müller and Inada, who found that the administration of small doses of iodide to healthy young men caused a marked diminution in the viscosity of the blood. This fact, he believes, explains the therapeutic effect of the drug in *arteriosclerosis* as the greater fluidity of the blood is equivalent to a dilatation of the vessels since it flows more rapidly. Romberg also believes that this effect explains why the drug should be long continued in order to be of value.

In the treatment of pulmonary *emphysema* the following formulæ[3] may be used:

℞—Potassii iodidi	ʒj.
Tr. hyoscyami	fʒiij.
Elix. calisayæ	q. s. ad f℥ij.

M. Sig.—One teaspoonful every three hours in water or milk.

℞—Potassii iodidi	ʒss.
Tr. belladonnæ	fʒss.
Spt. ætheris comp.	f℥ss.
Aquæ	q. s. ad f℥iij.

M. Sig.—One tablespoonful three times daily in water after food.

In the treatment of *acute rheumatism* iodide of potassium may be combined with the salicylates as follows:

℞—Potassii iodidi	ʒiij.
Sodii salicylatis	℥ss.
Spt. ætheris nitrosi	f℥j.
Syr. aurantii	f℥iiss.

M. Sig.—One to two teaspoonfuls every two hours, well diluted in water.

The *iodide of silver* is recommended by Siter and Uhle[4] in the treatment of *urethritis*. It is not claimed that this drug will render urethritis a trivial complaint, but it is stated that it is extremely serviceable in the acute stages and relieves the symptoms at this period almost immediately. The drug is suspended in a 5 per cent. solution of quince-seed mucilage. It causes no burning or irritation and can thus be used in stronger solutions than other silver salts and has the additional advantage of not staining.

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[1] British Medical Journal, January 14, 1905.

[2] Deutsche med. Wochenschrift, November 24, 1904.

[3] Journal of the American Medical Association, April 22, 1905.

[4] University of Pennsylvania Medical Bulletin, 1905.

Iodoform. Rossini[1] reports a case of *tuberculous cerebrospinal meningitis* which recovered from the use of iodoformed oil. He withdrew from 1 to 5 c.c. of cerebrospinal fluid and injected into the subarachnoid space an equal quantity of a 1 per cent. iodoformed oil. This procedure was repeated every six hours. In addition he injected into a vein every second day 1 c.c. of a solution containing 15 grains of iodine, 60 grains of potassium iodide, and 3 ounces of water.

Dewar[2] claims to have obtained good results in advanced *pulmonary tuberculosis* from the intravenous injection of iodoform. He uses an ethereal solution of iodoform to which is added a little liquid paraffin.

Two years ago Pryor[3] published a very complete paper showing the value of iodine in *puerperal sepsis*. He obtained the iodine effect by packing the pelvis with iodoform gauze. Burtenshaw[4] reports favorably on this method in a case of postoperative sepsis. Twice daily, after irrigating the peritoneal cavity, 2 drachms of a 10 per cent. solution of iodoform were injected through the drainage tube. Later the tube had to be removed and the iodoform was used twice daily in the form of vaginal suppositories (1½ drachms). In addition a half an ounce of an iodine-fat combination was injected high into the bowel every three hours during the day. He also used iodoform suppositories in the uterine cavity. The author also calls attention to the observation of Yeo that iodine in the form of iodoform is readily absorbed from the skin. Yeo has reported cases of *tuberculous peritonitis* successfully treated by making daily applications to the abdomen of an ointment containing equal parts of iodoform and cod-liver oil.

Pugh[5] recommends the iodine treatment for *infected wounds*. He uses the *tincture of iodine*, which is applied by means of a swab made by twisting a piece of cotton around a toothpick. Pugh mentions the following class of cases best adapted to the local use of iodine: *scalp wounds*, *ulcers of the leg*, *inguinal adenitis*, and *vaginitis*. In the treatment of gonorrhœal vaginitis it is particularly valuable. He has also used iodine successfully in the various forms of surgical tuberculosis.

Iron. Knott,[6] in an article on the therapeutic virtues of iron, calls attention to some important points in regard to its administration. The excessive use of iron leads to a distressing plethora which is further aggravated by the constipation present. This condition is known as siderismus. The symptoms of this condition are violent pulsation of the arteries, especially the carotids, headache, cardiac palpitation, feverishness, flushed face, and injested conjunctiva. There are in addition epigastric pain, with a sense of fulness and weight, furred tongue, anorexia, and occasional colicky pains. Knott states that when there is disease of the gastrointestinal mucous membrane iron will produce a severe diarrhœa or aggravate the symptoms already present. He states that the failure of iron in anæmia may sometimes be attributed to this fact. Experimental investigation has also shown that iron has an irritating action on the intestinal mucous membrane. Because of this irritating tendency of the iron Knott says it should not be used when there is organic intestinal disease in the early convalescent stage of typhoid fever, and dysentery, and in tabes mesenterica and pulmonary tuberculosis.

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[1] La semaine médicale, 1904, No. 44.

[2] British Medical Journal, January 14, 1905.

[3] New York Medical Journal, January 23, 1904.

[4] American Medicine, March 11, 1905.

[5] Ibid., October 15, 1904.

[6] Ibid., December 17, 1904

In the treatment of *chlorosis* iron is practically a specific, although not so reliable in other forms of anæmia. To ensure the best results from iron a free action of the bowels must be secured, and in addition its combination with arsenic seems to increase its blood-making power. Knott also refers to the use of sulphate of iron in septic conditions, the hæmostatic power of certain of the salts and the antidotal properties of the precipitated ferric oxide in arsenical poisoning.

Clark[1] after experimenting with several combinations of iron in treating chlorosis found that Blaud's pill was after all the most satisfactory.

Latham[2] calls attention to the well-known value of *perchloride of iron* in *sepsis*. In regard to its use in *diphtheria* there is still some question as to whether this iron preparation should be used with antitoxin or independently of it. If used independently it still remains to be seen at what stages of the disease one or both should be administered.

Robson[3] adds *iron acetate* to the list of drugs supposed to have a favorable influence on pneumonia. In severe cases the acetate of iron was alternated with strychnine.

Isopral. This new hypnotic is believed by Stoner[4] to be superior to chloral in activity, and that, furthermore, it is without any of the latter's depressing phenomena upon the circulatory or respiratory functions. Isopral occurs as a colorless, shining crystalline powder, slightly soluble in water. It has a slightly burning taste and a characteristic pungent odor. Stoner recommends that the drug be given in capsules or wafers in the dose of 10 to 15 grains.

Lead. The following articles show the numerous ways in which poisoning may occur from lead. Lewin,[5] who has made elaborate studies of industries producing *lead poisoning*, found that it was more common in women than men when both are equally exposed. Among other interesting points he found that of 81 women examined there had been 123 pregnancies with but 14 living children. Abortion is frequent and the death rate among children born living is very high. Hall[1] states that within recent years the abortifacient property of lead has become pretty generally known among the laity in certain parts of England. As a result numerous cases of plumbism are occurring among women who have sought to produce an abortion by taking pills containing lead. In some instances the poisoning has been acute in character, but the majority are chronic as the result of the small quantities of lead contained in the quack "female irregularity" pills. Lefour[2] reports an instance of lead poisoning in a woman during pregnancy. In this case the source of the lead was the wall-paper. In her first pregnancy the fetus was born dead and in the second the child was born prematurely and was very feeble. Lewin[3] in another contribution on lead poisoning among industrial workers states that the lead has a particularly bad effect on the eyes. Among the eye disturbances noted were transient blindness, atrophy of optic nerve, retinitis with albuminuria, paralysis or cramps of the ocular muscles, and corneal opacities. Lewin states that there is a long interval between the changes which could be recognized by the ophthalmoscope and those of which the patient first complains.

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[1] Medical Times, 1904.

[2] Lancet, November 19, 1904.

[3] British Medical Journal, April 15, 1905.

[4] New York and Philadelphia Medical Journal, March 25, 1905.

[5] Berliner klin. Wochenschrift, 1904, No. 41.

Miller[4] has reported two instructive cases which emphasize the necessity of exercising care when administering lead internally. In both instances capsules containing lead acetate were given for a diarrhœa. In one case a capsule containing 1 grain of lead acetate among other ingredients resulted in the production of chronic plumbism. In the second case capsules containing 2 grains of lead, of which twenty-three were taken, produced acute manifestations of lead intoxication. Recovery occurred in both cases.

Mercury. The intramuscular therapy of *syphilis* has been fully considered by Dr. Gottheil in the September issue of PROGRESSIVE MEDICINE, p. 135. Additional articles have been published in favor of this method by Lannois,[5] Kilbane,[6] Sinclair,[7] and Schnabel.[8] Faure[9] also recommends this method in treating nervous diseases of syphilitic origin.

[1] British Medical Journal, March 15, 1905.

[2] L'obstétrique, July, 1904.

[3] Berliner klin. Wochenschrift, December 12, 1904.

[4] Therapeutic Gazette, August, 1904.

[5] Lyon médicale, October 30, 1904.

[6] Medical Record, July 29, 1905

[7] New York Medical Journal, October 22, 1904.

[8] Deutsche med. Wochenschrift, 1904, p. 1893.

[9] Lancet, December 10, 1904.

Hutchinson[1] adheres to the internal administration of mercury in treating syphilis. He prefers the hydrargyrum cum creta in doses of 1 to 2 grains frequently repeated. For the prevention of diarrhœa 1 or 2 grains of pulv. ipecacuanha co. should be combined with each dose of mercury. The mercurial course should be kept up uninterruptedly for from one to two years.

Hollen[2] recommends the *nucleide of mercury* as the best preparation.

Almkvist[3] believes that *mercurial stomatitis* is generally due to the presence of decaying matter and of tartar on the teeth. For the prevention of this condition he recommends the following tooth paste:

Potassium chlorate	36 parts.
Sodium benzoate	3 "
Sapo albus	4 "
Sodium biborate	8 "
Glycerin	8 "
Etherol	1 "

The etherol is added to flavor the paste. The use of the paste may be preceded by rinsing the mouth with a little alcohol. The tartar should be removed by a dentist.

McAlister[4] and Snively[5] both speak favorably of *calomel* as an intestinal antiseptic. Snively states that the calomel under these circumstances is best prescribed in the form of a triturate containing $\frac{1}{10}$ grain of calomel and 1 grain of sodium bicarbonate.

Lesignoli[6] recommends calomel in cardiac and hepatic dropsy because of its diuretic properties. The calomel is administered in 2½-grain powders three or four times daily. Salivation must be guarded against.

The *Berliner Allgemeine Medical Zentral-Zeitung* of August 6, 1904,[7] cites the case of a woman six months pregnant in whom mercurial inunctions, given for secondary syphilis, produced intense enteritis. The symptoms disappeared upon withdrawal of the drug but promptly returned when the inunctions were resumed. Six weeks after she was delivered the inunctions were continued without any ill effects. The diarrhœa was attributed to swallowing the saliva, which was very profuse. The teeth were in very bad condition.

Toff[8] points out the dangers of *bichloride* solutions in puerperal women. In some cases the toxic effects are manifested by gastrointestinal disturbances, and the diarrhœa which sets in several days after labor may also be associated with prostration, collapse, colic, etc. Errors in diet are supposed to be responsible, and it is only the appearance of oral symptoms that directs attention to the bichloride douches. When the kidneys are attacked the condition is more serious. Besides the appearance of albuminuria puerperal fever may be simulated by the chills, fever, scanty lochia, etc. When the real cause is discovered the douches should be stopped at once and irrigations of normal salt solution used. Owing to the susceptibility of patients to this preparation Toff recommends very dilute solutions, 1:6000 to 1:10,000, and that in addition the douche should be followed by an irrigation of normal salt solution to wash out any of the bichloride which remains. The presence of renal or intestinal disease contraindicates the use of bichloride.

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[1] Berliner klin. Wochenschrift, September 12, 1904.

[2] Medicine, February, 1905.

[3] Hygiea, Stockholm, 1905, Nos. 9 and 10; abstract, Journal of the American Medical Association.

[4] Therapeutic Gazette, October 15, 1904.

[5] Pennsylvania Medical Journal, 1904.

[6] Il Policlinico, 1904, No. 67; abstract, American Medicine.

[7] Abstract, Medical Record.

[8] Berliner klin. Wochenschrift, December 5, 1904.

Mushroom Poisoning. Berry[1] has contributed an excellent article on "Mushroom Poisoning." Although there are a number of poisonous mushrooms, nearly all the fatal cases are caused by one of three varieties—viz., the amanita muscaris or fly mushroom, amanita verna, and amanita phalloides. The fly mushroom is found during the summer along roadsides at the edge of fields and in groves. It does not occur in the grassy pastures preferred by the common mushroom. This mushroom varies from a yellow to a bright orange or red, and on the surface are a number of warty scales which can be easily scraped off. The poison cup or amanita phalloides grows in the woods and on the borders of fields and does not grow in meadows. The cup is usually pure white and when wet is slimy and has a peculiar rank odor. "As a general rule, beware of those fungi that have little white gills, hollow stems, and sit in a socket, or are bulbous." Berry also advises the rejection of all mushrooms that are the slightest bit decayed or are worm-eaten.

After the ingestion of poisonous mushrooms symptoms may appear very shortly or be delayed for as long as twelve hours. The attack is ushered in by colicky pains, nausea, and vomiting and purging; in addition, the pulse becomes slow and thready, the respiration short and labored. The pupils are contracted, and there is dimness of vision. Later, the pupils become dilated, the extremities cold and moist, and the patient becomes stuporous. In fatal cases the heart becomes weaker and weaker, death finally resulting from paralysis of the heart. *Atropine* given in any but the final stage is the antidote. The atropine should be continued until marked physiological action is produced. A non-depressing emetic, such as sulphate of zinc, should be used, although it is not often necessary, as usually all the undigested particles have been vomited. As these patients are usually profoundly shocked, they should be kept quiet in bed, the heart stimulated by digitalis, brandy, or ammonia and external heat applied about the body. Berry states that if heroic measures are applied and the patient carried over the crisis there is a good chance of his recovery.

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[1] Pennsylvania Medical Journal, November, 1904.

Neuronal, one of the newer hypnotics, is not very favorably looked upon by Euler.[1] He employed it in doses of from 15 to 45 grains, but does not advise its use because of its lack of reliability and also from the fact that patients become accustomed to its use. The drug is also not without disagreeable after-effects such as vomiting, diarrhœa, and dizziness. Neuronal is of no value for the relief of pain.

Nitroglycerin has been the subject of a number of contributions during the past twelve months. Attention has been previously called to the rapidity with which most individuals become accustomed to this drug.

D. D. Stewart[2] has reported several cases in which enormous doses of the drug have been taken—in one instance 5 minims of the pure drug and in another 20 minims. He states that while these large doses, when reached gradually from small initial doses, are apparently harmless, they are not advisable. When employed for the reduction of arterial pressure nitroglycerin should not be relied on alone but due attention should be paid to the dietary and the emunctories. Allbutt has also recently called attention to this point in the prevention of apoplexy. While recognizing the importance of vascular sedatives he places more reliance on diet and the mode of life in dealing with increased arterial tension.

Hare[3] does not agree with Stewart as to the harmlessness of large doses of nitroglycerin. He believes that large doses continued over a long period of time will cause both loss of sexual power and loss of vesical control.

Hare also calls attention to two practical points in the administration of the drug—one is the combining of digitalis or strophanthus with the nitroglycerin after pressure has been lowered in order to stimulate the tired heart, the other point is the administration of the drug in chronic cases in a form which is slowly absorbed. This can be accomplished by the use of compressed tablets or gelatin-coated pills rather than the easily absorbed hypodermic tablets.

Loomis[4] from clinical and experimental observations believes that the ordinary dose ($\frac{1}{100}$ grain) is useless, as it is extremely transient in its effect and has little influence on the arterial pressure. He recommends $\frac{1}{50}$ grain as the minimal dose. Nitroglycerin has long enjoyed a reputation for increasing the urinary output in Bright's disease. Loomis, however, states that although he was constantly on the lookout for this evidence he was never able to satisfy himself that it was true. He believes that the drug's true field of usefulness is in those conditions due to arterial spasm such as *angina pectoris, migraine,* and *asthma,* when it should be given in full doses frequently repeated.

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[1] Therapeutische Monatshefte, 1905, No. 4.

[2] Journal of the American Medical Association, May 27, 1905.

[3] Therapeutic Gazette, August 15, 1905.

[4] Medical Record, March 18, 1905.

Binz,[1] in an investigation with nitroglycerin tablets, found that some of them were almost inert. In order to ensure accuracy and positive results he advises the use of an alcoholic solution of from 1 to 4 per cent. The dose of these solutions may be one drop gradually increased. Von Noorden[2] also advises the use of solutions in order to obtain satisfactory results. Since he has been using the drug in solution his results have been more constant and safer than when tablets were employed. Von Noorden begins the administration of the drug with a small dose and gradually increases it to $\frac{1}{6}$ grain or even $\frac{1}{5}$ grain in twenty-four hours. He has never noted any untoward symptoms. By giving the drug in this form and in this manner he has reduced the blood pressure from 220 or 180 to 100 or 120. The blood pressure not only remains low during the use of the drug, but frequently stays low for eight or even twelve days after it has been discontinued. After an interval the drug may be resumed again. Stewart[3] called attention to the fact that after an interval of rest a much smaller dose could be given when the drug was resumed.

McLaughlin[4] gives the following directions for treating *pulmonary hemorrhage:* Immediately on the occurrence of the hemorrhage $\frac{1}{100}$ gr. of nitroglycerin and $\frac{1}{4}$ gr. of morphine are given hypodermically. Adhesive strips are applied to the side from which the hemorrhage comes and the patient is instructed to lie on that side. Six hours after the occurrence of the hemorrhage the patient is put out-of-doors. This latter fact McLaughlin considers very important. At the end of four days the straps are removed and the patient is given a week of rest cure in the open.

Nitroglycerin alone has been employed for some years past in the treatment of hæmoptysis and its use was originally proposed, I believe, by Flick. When used alone it is given in $\frac{1}{100}$ grain doses every hour for six doses and then continued in $\frac{1}{100}$ gr. doses three times a day for several days.

Elvy[5] has found nitroglycerin of value in certain surgical conditions. He recommends the drug in incipient *gangrene* and in all cases in which there is an impaired circulation with contracted arterial walls. He has also found it of advantage in local congestions.

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[1] Therapie der Gegenwart, 1905, No. 2.

[2] Quoted by the Journal of the American Medical Association, October 22, 1904.

[3] Loc. cit.

[4] Medical Record, September 17, 1904.

[5] British Medical Journal, January 7, 1905.

Wherry[1] gave nitroglycerin a trial in the treatment of *erysipelas.* The results were surprisingly good, although the number of cases in which it was used is far too small to carry much weight. Wherry claims that the nitroglycerin caused a reduction in the temperature, moist skin, good appetite, steady pulse, and an absence of prostration. There was also a general feeling of comfort and a fairly rapid disappearance of the inflammatory process.

Olive Oil. In the treatment of certain forms of *constipation* Herschell[2] states that excellent results may be obtained by olive-oil injections. It is not to be used in the constipation resulting from improper food. The best results are obtained in the constipation depending on a chronic colitis or as a result of spasm of the bowel, such as occurs in neurasthenics. From three to ten ounces of warm oil are given at bedtime and the amount and frequency of giving it gradually reduced until the minimal amount necessary is found. The apparatus necessary is a glass funnel to which is attached a rubber tube twenty-seven inches long. To the other end of the tube is attached a nozzle with a rounded end to prevent injury. Both the tube and nozzle should be of large calibre to ensure the ready passage of the oil. The oil is heated by standing the funnel containing it in a basin of hot water. The oil is retained all night, the bowels being evacuated after breakfast the following morning.

Opium. The almost universal method of treating *pulmonary hemorrhage* is by the hypodermic use of *morphine.* Small single hemorrhages require no treatment aside from absolute rest, but with large hemorrhages or small hemorrhages frequently repeated morphine administered hypodermically is the best single drug. In addition to the morphine McLaughlin[3] gives *nitroglycerin* ($\frac{1}{100}$ gr.) and straps the side from which the hemorrhage comes.

Hyslop-Thompson[4] has the patient's head and shoulders raised, gives a $\frac{1}{6}$ to $\frac{1}{3}$ grain of morphine hypodermically and injects into the rectum 30 to 40 grains of *calcium chloride* dissolved in a little water. In addition an ice-bag is placed over the affected side and heat is applied to the extremities. The last-mentioned method is an excellent one with the calcium chloride injection omitted. The calcium chloride is of doubtful value for the control of hemorrhage, and in addition the turning of the patient to give the injection is an objectionable feature.

Grassman[5] states that within therapeutic limits morphine is not a cardiac poison. In *cardiac disease* associated with acute respiratory affections morphine must be used cautiously and the same care must be exercised in acute endocardial and myocardial conditions. It is of great value in *angina pectoris*. Grassman recommends morphine before digitalis in cardiac patients who are nervous and unable to sleep. In advanced heart disease *insomnia* or sleep frequently broken by bad dreams is very common. I have found that small doses of morphine ($\frac{1}{20}$ to $\frac{1}{24}$ grain) given hypodermically will often give the patient several hours of undisturbed sleep. These small doses may be repeated two or three times if necessary.

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[1] Journal of the American Medical Association, November 5, 1904.

[2] Lancet, October 1, 1904.

[3] Medical Record, September 17, 1904.

[4] British Medical Journal, December 17, 1904.

[5] Münchener med. Wochenschrift, 1904, No. 28.

Pilocarpine. Two years ago this drug was recommended as a remedy for *strychnine poisoning*. Meltzer and Salant[1] made some experimental investigations to determine the accuracy of this claim, and as a result of their work make the following statement: 1. Pilocarpine hydrochlorate does not act as an antidote to strychnine. 2. On the contrary, the addition of pilocarpine apparently supports the poisonous effect of strychnine and by its aid an ineffective subminimum dose may have a toxic or even fatal effect.

Pyoktanin was at one time highly recommended in the treatment of *ulcers*, *wounds*, and *malignant growths*. Friend[2] brings it to notice again. He recommends it in the form of a powder mixed with talcum or starch in the strength of 2 per cent.; as an ointment (10 per cent.) with vaselin or lanolin as a base; as a pencil which, after being dipped in water, may be passed over the surface of an ulcer and in solutions varying in strength from 1:1000.

Quinine. Bäcker[3] believes that quinine should receive more attention from obstetricians owing to its oxytocic properties. While it is not always effectual, its use will not infrequently render an instrumental delivery unnecessary. Bäcker gives the quinine in doses of 7½ grains two or three times at short intervals. Not infrequently the first dose has no effect, while the second or third are followed by strong uterine contractions. The same criticism may be made here that was made on the use of ergot—*i. e.*, there are other and safer means of stimulating the uterus.

Hewitt[4] claims to have obtained good results in the treatment of *exophthalmic goitre* with the sulphate or neutral bromide of quinine. He began with a gelatin-coated pill containing 5 grains of neutral bromide of quinine, morning and evening, and increased the amount to 15 or 20 grains daily.

Ashley-Emile[5] recommends intramuscular injections of quinine in intractable cases of *malaria*, where quinine cannot be tolerated by mouth and in the serious forms of pernicious malaria. He states that he has seen a 5-grain dose intramuscularly reduce the temperature, when 40 to 60 grains by mouth had no effect. The injections are made into the deltoid or interscapular muscles. The hydrochloride of quinine is the salt used.

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[1] Journal of the American Medical Association, December 31, 1904.

[2] Illinois Medical Journal, December, 1904.

[3] Deutsche med. Wochenschrift, March 16, 1905.

[4] Medical Times, January, 1905.

[5] Journal of Tropical Medicine, April 15, 1905.

Economou[1] states that the preliminary administration of *sodium bicarbonate* increases the action of quinine in malaria.

In the treatment of *pneumonia* Galbraith[2] recommends large doses of quinine. Poole[3] has also treated a small series of cases by this method. The routine treatment of pneumonia with a single drug as potassium iodide, digitalis, carbonate of creosote, or quinine is not likely to meet with universal favor. Any drug will probably achieve equally good results in a small number of cases. Probably no disease requires more individualization than pneumonia. Some cases need nothing more than careful nursing, in others the use of a stimulant at the right time will successfully tide over the crisis, while in others the most heroic methods are unavailing.

McGillwray,[4] in writing on *quinine amblyopia,* states that there are only about 100 cases in the literature. The toxic dose varies from 15 grains to an ounce a day. The condition is more common in women than men and occurs in those with a marked idiosyncrasy or neurotic temperament. It is bilateral and the intensity of the blindness is more marked than in any other form of amblyopia in which recovery is possible.

McGillwray recommends inhalation of nitrite of amyl and digitalis internally in the acute stages.

Salicylates. The intravenous administration of the salicylates as recommended by Mendel was mentioned in last year's review. As employed by Mendel the drug is administered in 4-grain doses at intervals of from twelve hours to three days. Ordinary antiseptic precautions should be taken and the vein should be fully dilated before puncturing. A different vein should be selected each time an injection is made.

Rubens,[5] in an experience with 60 cases, reports favorably on the method. The effect in *acute articular rheumatism* was most favorable, although the disease was not materially shortened. In *neuralgia* and *muscular rheumatism* the effect was so remarkable that Rubens considers the intravenous use of salicylate of sodium as a specific in these conditions. He also obtained good results in *pleurisy* and *acute laryngitis.*

In the treatment of *multiple arthritis* Santini[6] has had considerable success from intra-articular injections of salicylate of soda. In most joints a spot will be found where the capsule is slightly distended and this is the best point for the injection. If the capsule is very much distended some of the fluid may be aspirated before injecting the drug. At the shoulder-joint the injections can only be made about and not into the joint. The drug is given in a 3 per cent. solution of water. From 3 to 5 c.c. are usually sufficient. The pain is usually worse immediately after the injection but quickly subsides; there is also a drop in the temperature. Individual joints may be injected on successive days.

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[1] Grèce médicale; Journal of the American Medical Association, May 13, 1905.

[2] Journal of the American Medical Association, January 28, 1905.

[3] Ibid., June 3, 1905.

[4] Scottish Medical and Surgical Journal, November, 1904.

[5] Deutsche med. Wochenschrift, January, 1905.

[6] Abstract, Medical Record, October 29, 1904.

Seibert[1] reports favorably on the rectal administration of large doses of sodium salicylate in the treatment of *cerebrospinal meningitis.* He administers the drug in 15-grain doses every three or six hours. In some instances as much as 750 grains were given during the illness.

The bowel is cleansed by a large watery enema every twelve or twenty-four hours; 15 grains of the sodium salicylate are dissolved in a tablespoonful of warm water and injected into the bowel.

The observations of Klieneberger and Oxenius on the irritating effect of the salicylates on the kidneys was noted in last year's review.

Quenstedt[2] has also noted that salicylic acid in moderate doses is capable of producing irritation in a short time and that this persists as long as the drug is continued. If the drug is discontinued signs of irritation quickly disappear only to reappear if it is again resorted to. As no permanent bad effect is produced by the salicylates large doses should be used without hesitation whenever they are demanded.

According to Frey[3] even these minor irritating effects can be avoided. As the results of experiments on animals and himself he found that the kidneys could be protected perfectly by rendering the urine alkaline. The use of alkali in no way interferes with the action of the salicylates. The most suitable method of using the alkali is in the form of an alkaline water, as it has the additional advantage of promoting diuresis. Frey believes that this method also tends to check the gastric irritation.

Saw Palmetto. Van Zandt[4] has reported cases illustrating the value of saw palmetto. He has obtained excellent results with this drug in old men suffering from *prostatic troubles.* In this condition Van Zandt gives 1 drachm of the fluid extract of saw palmetto three or four times a day. Under this treatment the general condition of the patients has improved, they have had little annoyance in having to pass their water at night and the use of a catheter could be dispensed with. He obtained equally good results in the treatment of chronic inflammatory conditions of the tonsils. Saw palmetto has also been recommended in affections of the mucous membrane of the respiratory tract.

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[1] Medical Record, June 17, 1905.

[2] Therapie der Gegenwart, 1905, No. 3.

[3] Münchener med. Wochenschrift, July 11, 1905.

[4] Medical Record, June 17, 1905.

Strychnine. During the past year two communications have appeared as to the affect of strychnine on *blood pressure*. Cabot's[1] observations were made in febrile cases. He measured the blood pressure after the oral or hypodermic administration of strychnine and in order to avoid errors the measurements were taken in many cases before and after the use of the drug. Cabot concludes from this study that in the dosage usually employed strychnine has little influence on the blood pressure as determined by the instruments at present in use.

In an experimental research on the value of strychnine in *shock*, Crile[2] found that in normal animals when sufficient strychnine was given to cause an increased excitability of the spinal cord, as indicated by an increase in the reflexes and muscular tone, a rise in blood pressure resulted. In forty-eight carefully observed measurements, when smaller doses were employed, no noteworthy change occurred.

The use of the *nitrate of strychnine* in treating *diabetes insipidus* was mentioned in last year's review. Two additional articles have appeared during the past year, one by Stein[3] and the other by Leick.[4] The drug is administered hypodermically, the initial dose being $\frac{1}{25}$ grain. The amount is gradually increased up to $\frac{1}{12}$ grain.

Trional is usually looked upon as being perfectly safe and in therapeutic doses (7 to 30 gr.) incapable of causing untoward effects. A case of *poisoning*, however, has been reported by Moreau.[5] A dose of 12 grains given for insomnia produced the following symptoms: The morning after the dose was taken the patient complained of a sense of fulness in the head and weakness. That morning the same dose was repeated, and after nine hours' sleep the patient again awoke complaining of headache and weakness. Later there was sweating, nausea, diarrhœa, and roaring in the ears. Strychnine ($\frac{1}{60}$ gr.), three times a day, caused the symptoms to disappear. Moreau considers this a remarkable instance of idiosyncrasy.

Tuberculin. The long-standing prejudice against the use of tuberculin, either as a diagnostic or curative agent, is passing away, although its use, as Baldwin[6] states, must of necessity be largely limited to institutions. This is necessary because the dosage, intervals between injections, and other symptoms require considerable care and attention. In considering the use of tuberculin as a curative agent in tuberculosis Baldwin states that there are two possible important ends to be attained. First, "we may succeed in fortifying the patient artificially against the specific poison," and, secondly, "under this stimulus aid in healing an otherwise sluggish tuberculous ulcer."

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[1] Boston Medical and Surgical Journal, September 29, 1904.

[2] New York and Philadelphia Medical Journal, September 24, 1904.

[3] Münchener med. Wochenschrift, 1904, No. 36.

[4] Deutsche med. Wochenschrift, 1904, No. 33.

[5] Journal des praticiens, 1904, No. 35.

[6] Journal of the American Medical Association, November 26, 1904.

In using tuberculin for its curative properties Baldwin believes that it is best to give the treatment in several courses if a favorable action is not obtained by the first injections. He states that the reason for this procedure is that during the process of immunization against tuberculin a certain degree of immunity is also obtained against the disease, but after the injections have reached a maximum dose, beyond which there is no local reaction and no increase in the agglutinative power in the blood, it is useless and generally harmful to proceed farther.

In regard to the danger of spreading the disease by the use of tuberculin, Baldwin says that while experimental evidence and the clinical experience of those who have had most opportunity to form unbiased opinions are against this view, nevertheless it must be borne in mind that during a violent local tuberculin reaction the conditions are such as to favor the scattering of tubercle bacilli, because the blood and lymph streams are then much more active about the tubercles.

Baldwin believes that all forms of acute tuberculosis should be excluded from the tuberculin treatment, both on account of the danger of increasing the load for the already poisoned cells and of the possible extension of the disease, either from the increased inflammation or from decreased resistance.

Patients with advanced lesions complicated with other infections, renal or intestinal disease, as a rule, also have overburdened cells, and for this reason are not suitable for the tuberculin treatment. This does not hold true, however, in certain chronic cases with good nutrition.

Cases most suitable for the tuberculin treatment, in Baldwin's opinion, are those with a limited lesion in which the ordinary hygienic-dietetic plan has failed to produce a scar and there is danger of the disease assuming a chronic type. In these cases, which he terms as arrested or incompleted cases, the physical signs do not indicate extensive ulceration, and yet they continue to have expectoration with bacilli as the only symptom. It is of great importance to obtain a healing of the ulcer, and Baldwin believes that statistics show that more persons may be healed by the use of tuberculin than without its aid.

T. W. Brown[1] reports a case of *tuberculosis of the bladder* which was successfully treated by the use of tuberculin.

Some interesting experimental studies on tuberculin by Trudeau,

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[1] British Medical Journal, May 20, 1905.

Baldwin, and Kinghorn have been published in the *Journal of Medical Research* for August, 1904.

In this connection may be mentioned a paper by Sawyer[1] on the treatment of tuberculosis with the *watery extract of tubercle bacilli.* In 14 cases in which he was able to give the extract a thorough trial he obtained a satisfactory recovery in all of them. He states that there were no undesirable complications or untoward results from the use of the watery extract.

Urotropin. The use of urotropin in *scarlet fever* for the prevention of *nephritis* was mentioned in PROGRESSIVE MEDICINE last year (December, 1904, p. 360). The favorable report of Widowitz is confirmed by Buttersack,[2] who ascribes its favorable action to the liberation of nascent formaldehyde in the glomeruli and tubules, thus neutralizing the toxins or destroying the bacteria at the points where the trouble starts.

Buttersack advises a dosage of from ¾ to 7½ grains three times daily. There need be no fear of untoward affects. When not used as a preventitive throughout the attack the drug should be started with the first appearance of albumin.

Veronal. This new hypnotic was very favorably commented on last year. Burnet[3] also recommends the drug and in common with previous observers noted no ill results from its use. He obtained good results in a variety of conditions needing a sedative, such as pneumonia, senile pruritus, insomnia, neuralgia, and neurasthenia.

Being a new drug it is but natural that veronal should be added to the already long list of remedies used in the treatment of *whooping-cough.* Fraenkel[4] has used it in 28 cases of this disease with remarkably good results, a fact which is unfortunately claimed for most remedies tried in this disease. He administers the veronal in ½-grain doses three or four times daily in very young children; older children were given 1 to 1½ grains three or four times daily. No ill effects were noted nor was the sleep-producing action of the drug sufficient to cause its disuse.

According to Fraenkel the spasm disappeared in a few days.

Kress[5] sounds a note of warning in regard to veronal. In an experience with 12 cases in which the drug was administered in 7½-grain doses he noted a marked cumulative action in several instances. The individuals so affected slept for several days, took hardly any food and were unfit to leave their beds. This observation is important, as the dose used by Kress (7½ grains) is far below the maximum dose recommended last year (4 to 12 grains, Poly).

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[1] Therapeutic Gazette, June, 1905.

[2] Deutsche Archiv f. klin. Medizin, 1905, Nos. 3 and 4.

[3] Journal of Nervous and Mental Diseases, December, 1904.

[4] Deutsche med. Wochenschrift, 1905, No. 6.

[5] Therapeutische Monatshefte, 1905, No. 1.

Very large doses of the drug produce deep sleep, weak respirations, slow, weak pulse, and delirium. Various rashes may also occur as the result of excessive dosage. Clarke[1] has reported a case of veronal poisoning and Gerhartz (quoted by Clarke) has had a similar case.

Yeast.[2] The use of brewers' yeast in the treatment of *pyogenic infections*, such as *acne*, *furunculosis*, *malignant pustules*, etc., has long been known. Its mode of action is as yet but little understood. The clinical fact, however, has been endorsed by animal experiments which show that in many of the mild forms of pyogenic infection that the administration of yeast has a favorable action. Inasmuch as the remedy is simple and perfectly harmless, it can safely be recommended.

Internally it may be given in doses of a teaspoonful to a dessertspoonful dissolved in a glass of water, taken three times a day at the beginning of or during each meal. Fresh brewers' yeast is the form usually employed, although bakers' yeast has been employed.

Recently a number of observers have recommended yeast in the treatment of *gonorrhœal conditions in women.* Among those who have written on the subject are Czerwenka,[3] Cronberck,[4] and Schiller.[5] Schiller cleanses the vagina with sterile water and then introduces two teaspoonfuls of fresh brewers' yeast and one teaspoonful of grape-sugar, so that the walls of the vagina are coated with it. A vaginal douche should be used in from eight to twelve hours, which removes the yeast used. The yeast is again used in forty-eight hours. The treatment is applicable in cases of acute and chronic gonorrhœa of the vagina and cervix and to a less degree in cases of *purulent vaginitis* and *endocervicitis* due to other causes.

Huggard and Marland[6] have treated 36 cases of *tuberculosis* with yeast. They state that some improvement was noted in nearly every case in which the yeast had been taken for a month. Huggard and Marland found that yeast seemed to produce an immediate and quite marked increase in the number of leukocytes, but that this was followed by a decrease, and that after some fluctuation there were fewer cells than when the yeast was begun. The daily amount taken was about the size of a walnut. It is best given in cold or tepid milk or in water.

In commenting on the above paper Ullman[7] points out that he had previously (1901) called attention to the value of large doses of brewers' yeast in the treatment of tuberculosis. Since writing this paper he has continued to use yeast with the greatest benefit to his tuberculous patients. He recommends that the yeast be given in doses of from two to three ounces three times daily.

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[1] Lancet, 1904.

[2] Editorial, Journal of the American Medical Association, 1905.

[3] Wiener klin. Wochenschrift, December 1, 1904.

[4] Centralblatt f. Gynäkologie, 1904, No. 44.

[5] American Journal of Obstetrics and Diseases of Women and Children, May, 1905.

[6] Lancet, June 3, 1905.

[7] Journal of the American Medical Association, 1905, p. 207.

The cure of a single case of *Addison's disease* by yeast is recorded by Dumas.[1]

Mandelstedt[2] finds that compressed yeast is serviceable in reducing the thirst and glycosuria of *diabetes.*

Kempf[3] has treated six cases of *sepsis* and *gangrene* with yeast poultices. The poultice is prepared by taking one quart of brewers' yeast and one pint of *finely sifted cornmeal.* These are mixed and placed near a fire until rising occurs, when about 2 ounces of finely powdered charcoal are mixed with the fine raised dough. The dough is smeared on a thick cloth and applied directly to the affected part. The poultice should be reapplied every twenty-four hours. Kempf found the treatment efficient for gangrene, eczema, ulcers, etc.

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[1] Revue francaise de méd. et de chir., February 6, 1905; abstract, New York Medical Journal, March 25, 1905.

[2] Vratchebnaya Gazette; abstract, Journal of the American Medical Association, September 17, 1904.

[3] Indiana Medical Journal, August, 1904.

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